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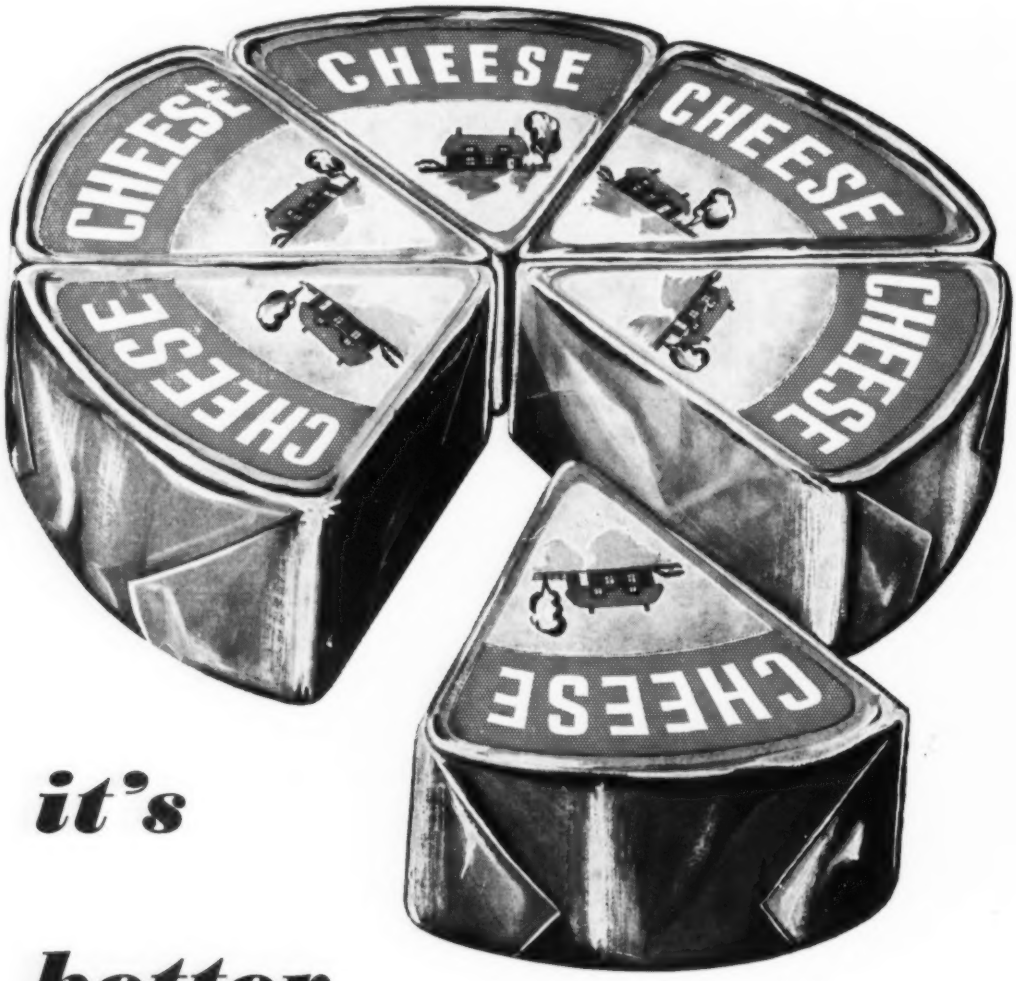

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FOOD MANUFACTURE

Vol. XXVII. No. 8 · Published Monthly · August 1, 1952

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Vol. XXVII, No. 8 August 1, 1952

The Economic Survey

THE sixth annual Economic Survey, which has recently been issued, reveals once again the precarious background to British life, and with inevitable particularity to the British diet. As a document, the Survey has greater relevance than most official publications for those who produce, process, or distribute foods. It could hardly be otherwise. No large and concentrated population in the world ever relied so much upon imported foodstuffs for its standard of eating. The hope of recovering our former capacity to import more than 60 per cent. of our diet has now melted in the hotter atmosphere of the Cold War. With time, such hope would have been dissipated anyway; Korea has speeded the process.

Whether the general realisation of the facts has similarly been speeded is another matter. How many of our fifty million consumers of food digest Economic Surveys as well? The trouble with these is that they are read only by those who are already reasonably well informed. The basic facts upon which national policy must be decided can reach a wide audience only through the Press and radio or, through these same media, by outstanding speeches from statesmanlike politicians. Unhappily food and its supply has been a party-political football in recent years and the ordinary person's understanding of the basic situation has not been improved by unwise attempts to connect sizes of weekly rations with votes at elections.

The original programme for expenditure on all imports for 1952 provided for much the same food consumption as in 1951. The serious changes in our balance of payments during 1951 (a year during which a former annual balance of £4 millions became a deficit of £521 millions!) have required a revision of the 1952 programme. The Government has reduced the import buying plan by £600 millions. To keep industry supplied with its essential needs, this huge reduction has had to fall mainly upon food consumption and upon stock building of food, tobacco, and raw materials.

Taking an overall picture, it is difficult to see how any other course could be adopted in face of the financial facts; argument worthy of the name can merely query small details. If industry, the heart and lungs of our difficult economy, is not kept going, the total position can only worsen; even so, industry is to be kept supplied with vital materials on a narrower, hand-to-mouth basis than before.

The heavy cuts in food consumption fall mainly upon unrationed commodities, and this has meant the revoking of Open General Licences with import quotas in their place. Of the £150 millions of foreign expenditure to be saved in this way, £100 millions will be saved on food. Already we have seen the first impacts of this change in policy, a notable example being that of the ice cream industry whose remarkable post-war expansion had been considerably based on the use of imported fats and sweetening agents—essential materials that are now severely cut.

But a cold wind for one section of the food front is a Gulf Stream breeze for another. The production of food at home from our own soil must now receive greater encouragement than ever before. To those who have wisely seen the food problem of this country as a long term issue, this will be the blessing that comes from misfortune. There has been much talk in these last few years about permanent security for British agriculture, but farmers themselves have been increasingly distrustful since 1948; not without evidence they have felt that the rest of the country had been hoping the time would return when easy imports could replace our own harvests.

Nothing has vanished more certainly in our worsening economic condition than this foolish pipe-dream—there can be no such return, and more and more production of food from our own soil has become imperative. No Government can dare to neglect agriculture; of all the raw materials upon which we depend for existence no other, except coal, can so readily be produced at home by our own efforts. If the maximum import cuts have had to fall upon food, this in itself shows that the greatest advance we can make towards a more balanced national economy is to produce more food ourselves. It can be done. The scientific means exist; all that is needed is the stimulus, partly economic and partly psychological. In this respect the Economic Survey flagrantly dodges the vital issue when it reports that the cessation of agricultural expansion since 1949-50 is attributable to bad weather. Farmers would doubtless be able to put forward a far more valid explanation.

Time and Motion Study cuts Work

THE use of string diagrams on wallboards used by time-study men at the South Lambeth plant of Brand and Co., meat essence manufacturers, as a means of finding a way of cutting down the distance walked by women workers while filling cartons, is described in *Target*, **5**, 5, 8.

A 25 per cent. increase in productivity and a similar increase in workers' bonuses have resulted from this work.

The string diagrams were used in the assembly department, where two stacks of cartons (plain and show types) were needed for each of 11 varieties of paste. Two representative "tie" sheets, comprising 33 orders with a total of 349 cartons, were chosen for the test, and coloured strings run out on the boards to represent two workers' movements while preparing the orders. The first diagram showed that one worker covered 979, and another 1,048 yards.

The carton stacks were re-arranged with the most popular varieties nearest the operatives, and a second diagram set up. This time the distances went down to 514 and 518 yards. A third experiment was made with smaller tables and a light trolley carrying 24 cartons. Result—the distances were cut to 346 and 340 yards.

Although this does not mean a big saving in money, the workers are now less tired (six pottings weigh 22 lb.) and can therefore produce more.

The time-study department also tackled the tying of cloths on 1 lb. basins of Christmas puddings. The old method involved 26 operations. A new method, needing only 16 operations, was evolved, and new workers learned it quickly.

Refining Sugar Cane Wax

A TEAM of Australian scientists, under the leadership of H. H. Hatt, has developed a process of refining crude sugar cane wax. This process is claimed to produce a better wax than does conventional solvent extraction, but it is likely to be more expensive. Interest in sugar cane wax is considerable; it is thought that 60,000,000 lb. per annum could be produced from Cuban mills alone.

The wax occurs as a thin white layer on the outside of the sugar cane. During milling it becomes entrained with the juice; after clarification with lime it is deposited on the filter press cake. The method used by the Australians involves demineralisation with hydrochloric acid, vacuum distillation for the removal of components of lower molecular weight, and a chromic acid bleach.

According to *Chemical Week* (**69**, 25, 23), demineralisation takes 25 hours, and is the time-limiting factor in the plant design. On the basis of treating 1,070 gal. per day of wax, having an average mineral content of 5 per cent., 900 gal. of 3·3 per cent. hydrochloric acid would be required. The wax is then sent to the distillation unit, where the lower-molecular weight components are removed under 1 mm. pressure at 300°C. In the last stage, the remaining wax is bleached at 110°C. with a mixture of chromic and sulphuric acids. It is then washed with boiling sulphuric acid (30 per cent. w/v) and with water and dried under low (200 mm.) vacuum. The Australians estimate an overall yield of 50 per cent. from crude to refined product.

Although the process is more expensive than the existing ones, the Australians claim the wax produced to be more flexible and capable of being modified to start a new series of waxes. Also, it is claimed the process is capable of taking crude wax from different mills, and turning out a uniform product.

Electronics in Materials Handling

THE application of electronics to industry as one of the keys which will give the vast production required from the factories of the future was discussed by Mr. L. Landon Goodman, B.Sc., A.M.I.E.E., of the British Electrical Development Association, in a paper on "Electronics in Materials Handling" to the Mechanical Handling Convention held recently.

A number of typical applications of electronics to industrial processes was described in detail by Mr. Goodman.

In a bakery, baking tins were sprayed with fat before filling. The movement of the tins along a belt conveyor interrupted a light beam, and this operated a spray-gun placed directly over the conveyor as each tin passed.

The light cell could be designed to inspect certain processes. An example occurred after the filling of cartons with powder. A light cell received the light reflected from the top of the powder. The cell detected if the carton were underfilled or overfilled; it did not then pass the impulse required for the machine to seal the top. Thus the cartons correctly filled were sealed, the others were not and were removed from the conveyor.

The necessity occurred in many industries for the sorting of articles by their external colour. The external colour of seeds and nut kernels gave a good indication of their condition, while fruit had a different skin colour according to its ripeness. Hand sorting was a tedious business open to error, and this was particularly so if the articles to be sorted were small, *e.g.* rice grains. There were a number of electronic machines on the market to do this job, and one such machine was designed for the colour selection of a wide variety of seeds, peas, beans, and nut kernels, and was entirely automatic.

A large number of other applications of electronic control was mentioned by Mr. Goodman. He

stressed that the equipment taking much power could be operated from a tiny power source, thus processes could be carried out which were not possible in other ways.

The correlation of processing and handling in a factory led to uniform flow and many benefits accrued. Productivity was greatly increased, machine loading was much improved, inter-process stores were cut down to a minimum, bottlenecks were eliminated, and the overall pulse of the organisation would beat more quickly and more regularly. In practice, many other results could be claimed, such as reduction in accidents to personnel and damage to products, uniformity of products, and better utilisation of labour and factory space.

Crabs going Abegging

THE tremendous annual wastage of crabs around the Scottish coast has recently been commented upon by Mr. Malcolm Macmillan, M.P., who has urged that some attention might be given to this source of material. At present crabs are seldom preserved, the herring fishermen and white fishermen throwing back smashed crabs as big as teaplates.

Yet imported crab meat sells at 3s. 9d. a 3 oz. can. Preferential attention has been given to lobsters which survive transport better. The only method of handling crabs has been to boil or quick freeze on landing. The latter method is an expensive one, although it is practised with success at Thurso.

Cooked crab meat, bought at about 7s. per stone, has been sold, packed in transparent paper, in the cities at 7s. 6d. per lb., according to Mr. Macmillan. He cites the experience of four small boats in Skye which have been landing 50 stone of crabs daily, 20 to the stone. If 40 boats worked this area he calculates a landing of upwards of 1,500,000 crabs in a 30-week season.

All the problems are admitted, but the point is repeated that a vast source of food is meantime going to waste for lack of organised handling.

Wild Coffee

ETHIOPIA is the only remaining country where *arabica*, the most common form of coffee, is found in its wild state. Last year, 100,000 bags were exported. Encouraged by evidence of world demand, Ethiopia has now called on FAO to help develop production.

Dr. Pierre Georges Sylvain, a coffee expert from Haiti, has been appointed to go to Ethiopia for FAO.

Dr. Sylvain's work may well prove of great importance not only to the coffee industry of Ethiopia, but to that of the whole world. This is because plant scientists have often found, in the original home of a plant, strains highly valuable to their efforts to breed better crops.

Wild coffee is resistant to *Hemileia vastatrix*, a rust-coloured fungus which has spread throughout the coffee plantations of Asia and Africa since the last century. The coffee industry of Ceylon, for example, was completely destroyed by it. Contagion has not spread to Central and Latin America, but it is constantly feared. As a result, research institutions everywhere want to be kept informed of the progress of the investigations of Ethiopian coffee.

"What is more," says Dr. Sylvain, "a lot more can be learned scientifically about coffee in the wild state than about coffee in plantations. Wild coffee's yielding capacity, too, will be of interest to growers throughout the world. Investigation may possibly prove its yield is greater than that of cultivated coffee."

If this proves to be true, it will be welcome news to millions of coffee lovers.

Birds and Milk Bottles

THERE has been quite a lot written about the opening of milk bottles by birds. This habit persists throughout most of the British Isles and is shared by birds in Sweden, Denmark, Holland, and the United States.

The subject has been treated from the observational and also the psychological aspect by R. A. Hinde and James Fisher in *British Birds*, **44**, 12, 1952. In Sweden blue tits, great tits, magpies, and blackbirds appear to be the main culprits, while in Denmark the great tit and the great spotted woodpecker come in for most of the blame.

Dr. Tinbergen, in Holland, has pointed out that milk bottles practically disappeared from Holland during the war and only became common again in 1947-48. He makes the interesting observation that it is unlikely that many tits which had learnt the habit in pre-war years still survived at that date, so that the habit must have originated in all the recorded localities since 1948, and as great tits are relatively sedentary birds, it would seem certain that the habit was started in many different places and by many individuals. How the birds recognise the milk bottle as a potential supply of food and learn the technique of opening the bottle is not quite clear. It has been suggested that it may be a consequence of the feeding habits of tits; they have an inborn tendency to inspect a great variety of conspicuous objects which contrast with their surroundings, and to test their palatability. If the outside of the object is unpalatable, they may attempt to open it by hammering. By a succession of similar steps evoked by successively more specific stimuli, a reward may eventually be obtained. It so happens that milk bottles have sufficient characteristics in common

with the natural food for tits occasionally to discover them in the course of their normal searching.

When a bird has fed once or twice from milk bottles, it will learn to return to them on later occasions, presumably by a form of trial-and-error learning. On these subsequent occasions the bird may come to respond to quite different stimuli from those which controlled its behaviour the first time. For example, if milk bottles with differently coloured stoppers are available, the tits will often concentrate their attacks on those having stoppers of one particular colour, presumably because the colour of the top was one of the characteristics which the bird learnt on the first visits.

Hinde and Fisher also suggest that the apparent copying of the behaviour by other individuals is probably due to another process—local enhancement—which modifies the appetitive behaviour of feeding, and is initially independent of reward.

Sugar's Future in Ceylon

THE provision of a sugar supply from lands being reclaimed under the Government's large resettlement scheme in the northern Dry Zone would make a most important contribution to Ceylon's economy and to the food supply of its 7,200,000 inhabitants. However, establishment of a successful sugar industry demands favourable climate, soil, and water conditions, the establishment of factories, and considerable research to determine whether the crop can be profitably grown. This preliminary experimental work is being carried out with the assistance of FAO expert, Dr. C. van Dillewijn, of the Netherlands.

During the experiments Dr. van Dillewijn applied a method he had developed in other countries, and calls growing "ideal cane." This method initially disregards economic considerations, and gives the cane maximum fertilisation, water, and cultivation. It is then simplified until an economic system is evolved for growing cane of good development and yield in the particular region.

Irrigation experiments were of special importance because of the limited amount of water available in Ceylon's Dry Zone. In two experiments, irrigation was delayed after the attainment of the permanent wilting point. Growth ceases at the wilting point, but photosynthesis continues, and since the industry is interested primarily in sugar yield rather than the size of the cane, a saving of water and labour were made.

Dr. van Dillewijn reports that the experimental stands obtained compare favourably with the best cane he has seen in leading cane countries. They are, he believes, clear demonstration that sugar cane can be efficiently and profitably grown in the northern Dry Zone.

Co-ordination in Food Processing

AN interesting development of "combined operations" in the food field is reported from Ayr, where canning, smoking, quick freezing, locker operation, and deep freezing are being developed under one roof—but by different concerns.

To launch a combined programme of this type would tax the capital resources, the skill, and the selling ability of most concerns; each field is a specialised one demanding individual knowledge and experience. The common factor in this instance was the need to secure factory space, and the availability of an ice factory with space to let.

The value of such a plant as a nucleus is demonstrated in the creation here of a herring canning plant on modern lines, with capacity to handle fruit and vegetables; of a kippering plant, and of a new quick freezing section to hold raw materials and to process them. Each of these developments is complementary and non-competitive, making it possible to co-operate as and when opportunity arises.

The development of such co-ordinated units around a nucleus plant, a cold store, an ice factory, or any other refrigerated unit, suggests itself as an economic method of meeting present costs.

Quick Frozen Breakfasts

QUICK frozen bacon and eggs are now being offered in Glasgow by a mass market food outlet. The first offer of the traditional British pre-war breakfast comes from Norway, and will be followed by further deliveries if import facilities and public demand encourage the trade.

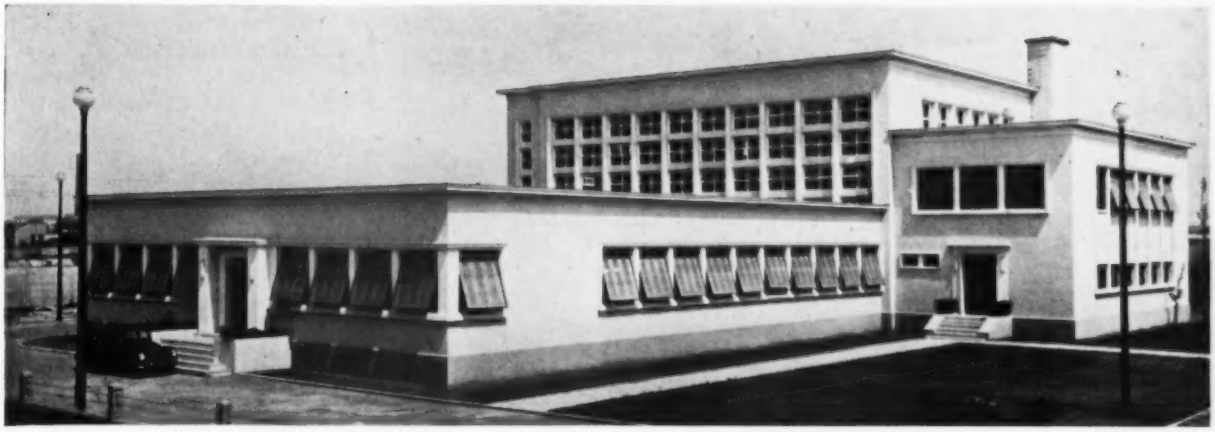
The pack is an attractive one and is offered in two sizes at 5s. and 10s. The smaller pack is designed to provide bacon and eggs for four people and the other is sufficient for eight people.

This offer emphasises the contention that prepacked meat will become an increasingly important factor in the food field and that meat trading as it is presently known will tend to give way to a new system of distribution using quick freezing or alternative methods.

The one defect in this contention is that the consumer still shows a reluctance to pay for the services. Quick freezing, with all the attendant costs of packaging and holding, must result in a more expensive product than the present raw unpacked one.

This is a general experience at the present time—consumers want top quality in all their purchases but are most reluctant to pay for it. The trend back to unwrapped bread—because of the cost of packing—is a case in point.

The scarcity factor is a further point in clearing present supplies of quick frozen food of this type at these prices; whether they would clear in a more competitive market remains to be seen.



Margarine Manufacture in France

Constructed for the *Société Desmarais* at Nanterre, the Excel margarine factory may justly be considered a model plant. By virtue of the preliminary study of the methods adopted by some of the most modern plants in Europe, the final layout and the manufacturing procedure incorporate the latest technical advances achieved by the margarine industry.

THE general scheme on which the factory was planned involved the following considerations:

1. A manufacturing cycle with maximum standardisation, all handling by mechanical means and reduced to a strict minimum; one-way traffic from the reception quays where raw materials are brought in to the delivery quays from which finished products are discharged.

2. Initial installation of a reduced number of low-power machines, with a view to later extension by increasing machinery and the replacement of present machines by more powerful units. Thus growth can be confined inside the factory without costly structural additions.

3. Comfortable working conditions whereby personnel, which is very reduced, will find hygienic, light premises likely to react favourably on their work.

4. Constant temperature maintenance and control.

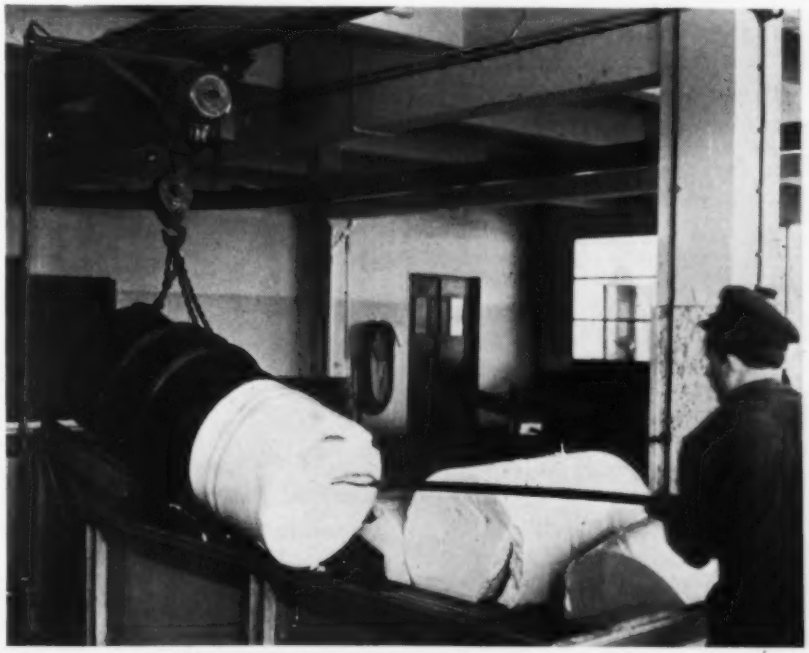
Preparation of Raw Materials

The ingredients of the margarine made in the factory are usually groundnut oil for the fluid fats, coconut oil for the solid fats, which is extracted from the pulp, or palm oil, either extracted from the kernel of the fruit or from its pulp. These different oils and vegetable fats are hydrogenated to give variable fusion points and to stabilise the emulsions.

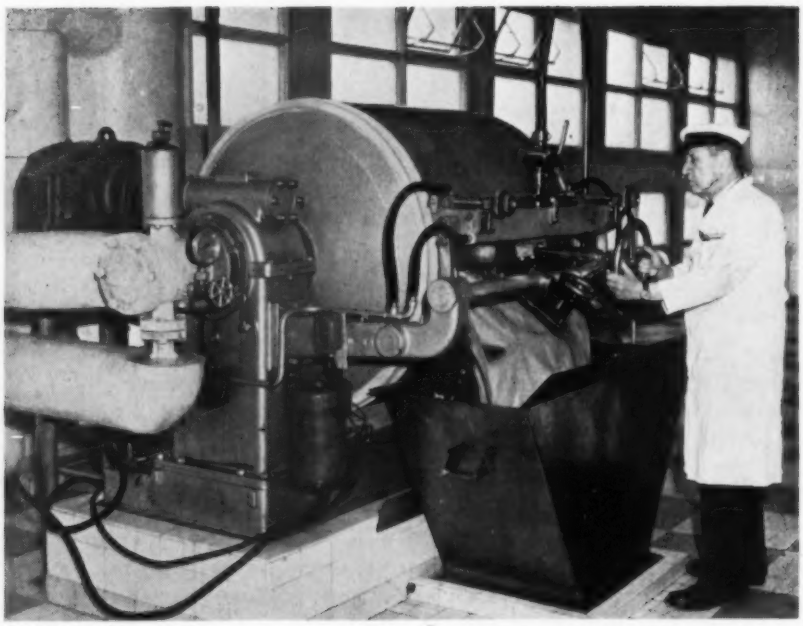
Before margarine production is started, all the ingredients undergo refining. This includes the neutralisation of free fatty acids, blanching, and deodorisation.

In the Nanterre plant fluid oils are received by tank trucks and stocked in the vat room, situated in the basement, in which a constant temperature is maintained summer and winter. Solid or hydrogenated oils are delivered either in tank trucks or in 200 kilo barrels.

The installations have been designed to take full advantage of the principle of gravitation. All



Fat from barrels being tilted on to the fusion grate.



The oil mixture is refrigerated to −17°C. in the double drum, which is worked by a rotating movement. The mixture is deposited in very fine layers on the cylinder and is scraped off in the form of a golden film.

operations are carried out on the second floor and the circuit ends in the central factory on the ground floor. The fusion room and pumping area are on the ground floor directly below the mixing room on the second floor. Oils are pumped directly from the basement to the stocking room on the second floor. Hydrogenated material in barrels is treated by placing these in steam vats for about two minutes to detach the fat from the sides of the barrel. The latter is then carried by pulley above the fusion grates. The lid is lifted, and the barrel so tilted that the fat slides out to rest on the grate. This consists of stainless steel tubing through which hot air passes, each grate being able to take ten blocks of fat. In contact with the tubes, the fat melts slowly and is collected in stainless steel vats having a double wall through which hot air passes, and from which the fat is pumped to the mixing room. This room is composed of large stocking vats, each carrying a measured quantity of oil. A constant average temperature of 40° to 50°C. is maintained.

At this stage manufacture starts, and consists of three main operations: emulsification, solidification, and kneading.

After the golden film of margarine is automatically scraped from the double drum of the cylinder, it falls in flakes through the stainless steel hopper into trolleys. These are then conveyed to the processing plant in the central factory, where the flakes pass through the kneading machine.

Emulsification

For the emulsification, a system of spouts in stainless steel convey the oils from the mixing room to a stainless steel weighing machine. After weighing, they are sent by gravitation into the mixing vats on the first floor. With the oils, substances such as salt, lecithin, etc., are added, as well as, by an independent pipeline, the water needed for the manufacturing process. This water is first filtered and purified in order to eliminate micro-organisms. The mixing vats, provided with hot water running through the double walls, are fitted with stirrers which start the emulsification. The mixture is then drawn up by a very powerful emulsifying pump and directed to the double drum, where solidification is achieved.

Solidification

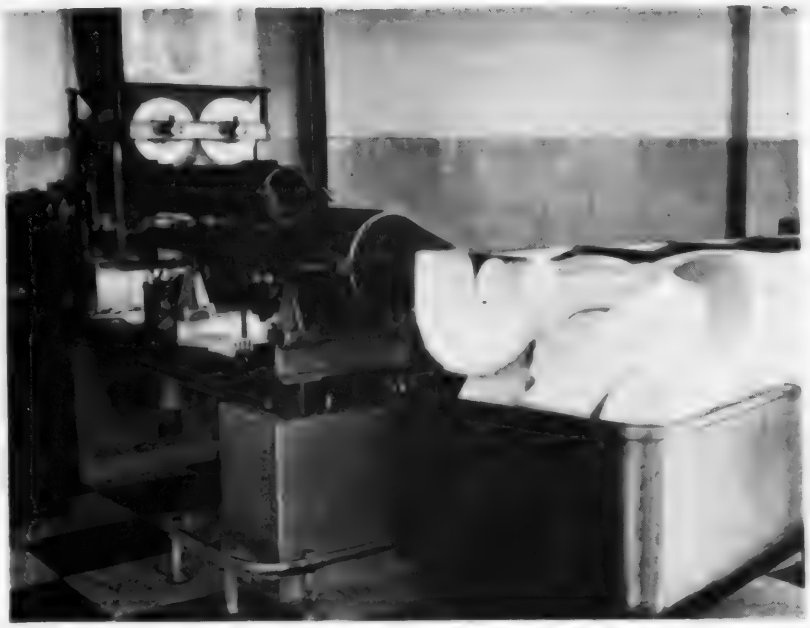
The double drum is a great steel cylinder refrigerated to −17°C. and worked by a rotating movement. The mixture reaches the drum by a small trough in the form of a spout, which deposits it in very fine layers (about 0·005 mm.) on the cylinder, and a knife-scraper placed at the base of the drum detaches the mixture as a golden film, which falls in flakes through a steel hopper linking it to the apparatus in the central factory.

Kneading

After the margarine is solidified, it only remains to render it supple and give it the necessary blandness. For this it is rolled in the kneading machine between two steel cylinders, whence it is carried in a vacuum by endless screws which crush and work it, and from which, having crossed several spiral grilles, it emerges in the form of a creamy roll. It is then collected in stainless steel trolleys and conveyed to the automatic packing machines.

Packaging

The packaging machines are of different types, handling packets of 250 grammes, 500 grammes, or 5 kilos, the rate varying from 60



After the margarine is solidified, it is rolled in the kneading machine between two steel cylinders, whence it is carried in a vacuum by endless screws which crush and work it. It emerges in the form of a creamy roll.

to 80 packets a minute. Each packet is automatically dated and weighed before being packed in cases. The machines use either sheet paper or bobbins fixed on a cutter. Two kinds of wrapping paper are used, one being sulphurised paper for products destined for direct use, and not to be exhibited in windows. This is first quality paper, its resistance being about 50-55 grammes. In addition, it is treated with about 3 per cent. glycerine in order to assure the suppleness required for folding. The other kind is for products which may be displayed, a complex of aluminium and paper being used. This is composed of embossed aluminium sheet, introduced to the market by the company. It is lined with a sulphurised sheet, and protects the product from air, light, and heat.

The Excel packets are then placed into cartons composed of fine corrugated cardboard with a double sheeting of waterproof paper which maintains the thermal insulation of the packed product, and renders it resistant to shock. The cartons are sealed and placed immediately in a cold room, and since margarine should not suffer sharp changes in temperature, it is kept at about 12°C. The cold room is adjacent to the despatch section where vans can be ranged alongside. Orders vary between 500 grammes and several tons, and delivery men are required to check the dates on packets stocked by shopkeepers and change old stock for fresh.

In drawing up plans for the factory, production has been rationalised as far as possible, and a time study made to cut out useless movement. The result is a continuous circuit from the reception of raw materials to the finished product.

All areas receive abundant natural light, laterally, from the broad glazed bays, and the factory on the ground floor is lighted by small lamps contained in square glass bricks. Fluorescent tubes have been installed in the machine rooms. The great glazed areas in the rooms are double-glazed to keep temperature constant. Heating throughout the building is by hot water radiators.

By using earthenware for the flooring and walls, and stainless steel for the machinery, the best hygienic conditions have been assured. Personnel is engaged only after strict medical examination. White overalls are obligatory, hair must be covered, and direct contact with the product forbidden.

Phosphates in Emulsification

PROMPTED by Depner's observation (*Wissenschaft und Praxis*, 1949) that addition of a phosphate led to a marked improvement in the emulsifiability of water-protein-fat mixtures, Drs. Lerche and Kelch (*Die Fleischwirstschaft*, March, 1952) have undertaken an investigation of the value of various phosphates as emulsifying additives with special reference to the utilisation of beef tallow in sausage manufacture. Advantage cannot be directly made of slaughterhouse tallow in sausage manufacture since the undesirable flavour and odour are serious drawbacks. On the other hand, an economic method of incorporation, which would eliminate these defects, would provide a useful market for tallow while improving the quality of sausage meat.

After discouraging results had been obtained with sodium polyphosphates, disodium orthophosphate, and potassium polyphosphate, it was found that by using suitable ratios of the two phosphates present in Plasmal, an emulsion, characterised by pure white colour, creamy consistency, and an almost nutty flavour, could be obtained.

A Stable Emulsion

The best results were obtained by first dissolving the required amount of the mixed phosphates directly in the hot tallow and then homogenising equal parts of hot water and the hot tallow. An extremely stable emulsion was thus obtained in a few seconds; this was incorporated in the proportion of 10 per cent. with the sausage meat inside the bowl chopper.

Far from detracting from the flavour of the sausages, the tallow appeared to impart a distinct improvement in this respect. Emulsification of tallow with the aid of a phosphate mixture by the above method requires only 0·5 per cent. of phosphate calculated on the finished emulsion. Since only 10 per cent. of the latter is included in the sausage meat, the phosphate content of the sausage is 0·05 per cent.

Factory Canteens

A BOOK* covering the whole subject of factory canteens, recently published, is a notable addition to the list of practical books on food technology, which already includes such works as "Food Industries Manual," "Applied Mycology and Bacteriology," "Chocolate and Confectionery," "Meat Technology," "Sausage and Small Goods Production," "Jam Manufacture," and "Food Poisoning," published by Leonard Hill, Ltd.

The 25 chapters of this book might well be termed a concentrated essence of the whole subject. The author first discusses the balancing of the canteen budget. A frequent question from the canteen customer is: "How is it that the café makes a profit while our canteen loses money?" The answer is that the owner of a small café can choose the position for his business. He can also choose what he is to sell, limited only by the availability of supplies and the necessary licence to sell them. He can also decide when he is going to sell, while bearing in mind overtime rates of pay. Therefore he can limit his hours of opening to suit his business, and incidentally his overheads.

The high price of cups of tea in the average café brings in an income of about 1s. per pint, compared with an income in the average canteen of 4½d. per pint. The average café, for a very considerable proportion of its trade, serves snacks. The profit on this type of trade is far higher than on the average main meal. If all costs are to be covered, the gross profit must be in the region of 50 per cent., and overheads would have to be kept to an absolute minimum.

The matter of the obtainment of a factory canteen licence is next discussed, and instructions for applying for this are given. On the subject of factory canteen management, three main methods are mentioned: (*a*) by a manager appointed by the company; (*b*) by a firm of catering contractors; and (*c*) by a committee of workers.

A quasi-official survey of canteens a few years ago reported that 76 per cent. of canteens came under (*a*), 21 per cent. under (*b*), and 3 per cent. under (*c*).

The factory canteen and its equipment are next described, and useful information is given as to the location of the dining rooms, kitchen, and food stores. The important matter of the selection of fuel and its cost, as well as such matters as hot water capacity, vegetable preparation, fish frying, and the many details involved in the whole organisation, are enumerated.

Under canteen furniture, the flooring, heating, lighting, wireless, and even decorations are competently discussed.

The author has some useful things to say about kitchen personnel, some of which might at first sight appear to be self-evident. He deprecates "shouting in the kitchen, except in the case of danger." Before the war, he says, many kitchens in the West End of London, staffed by foreigners, produced good food, but this can be produced by Britons if they are given the chance, and they would do it without turning the place into Bedlam. He considers that the little habit of throwing buckets of water over electrical equipment as a quick method of cleaning it is not to be recommended as it might lead to someone being electrocuted.

Another important chapter tackles the subject of tea. Here again the author gives simple instructions, and against the idea that the canteen must make tremendous profit from tea, he gives figures of the expenditure last year in four canteen units with which he is familiar.

Strongly advising the use of dish washing machines and detergents, he gives the reasons why these should replace old fashioned handling methods.

The purchase of food in the planning of menus is dealt with from the points of view of storage and purchasing of good quality meat, fish, vegetables, and other foods.

In the manner indicated by the foregoing, the author painstakingly ploughs through the multitudinous details of his subject, including refrigeration for canteen stores, the organisation of the bakery, the proper balance of the different foods for adults and young workers, the avoidance of food poisoning risks, Government regulations, canteen training courses, and entertainment.

* *Factory Canteens and Their Management in Great Britain.* By Jack Hampton. Pp. 126. Illustrated. Leonard Hill. Price 15s. net.

Vegetable Research

DESPITE the difficulties occasioned by the wet autumn, winter, and spring of 1950-51, the cropping programme planned by The British Society for the Promotion of Vegetable Research was carried out with considerable success.

In his report for the year ended September, 1951, the Director, James Philp, B.Sc. (Glas.), Ph.D. (Lond.), F.L.S., presents a summary of the research work carried out in plant breeding, entomology, physiology, chemistry, and statistics, and describes the investigations into the symptoms of crook root occurring in watercress beds.

It was found that dusts of low gamma BHC content, or 5 per cent. chlordane dust, applied by spoon around the stems of the plant gave excellent control of the cabbage root fly, and that careful application of liquid forms of gamma BHC, chlordane, or parathion to the base of the plants was similarly efficacious, none being found to harm the plants.

Progress is also reported in the study of the basic properties of dusts in relation to the control of insects on vegetable crops and of methods of formulating insecticidal dusts. It has been found that the effectiveness of DDT dusts for the control of pea aphids depends mainly on the aphids coming into contact with the dust while they wander over the plants and only slightly on the dust deposited on the bodies of the insects during dusting.

Lecithin in Food Processing

Part II

Francis Aylward, Ph.D., F.R.I.C.
Department of Food Technology, Borough Polytechnic.

In Part I of this series it was shown that commercial "lecithin" obtained from soya, maize, groundnut and rapeseed oils is a mixture of substances, known collectively as phosphatides, which can be regarded as complex phosphorus and nitrogen-containing fats. The phosphatides are naturally occurring compounds of nutritional value and because of their surface-active and other properties they are widely used in food processing. In this instalment the author discusses the use of lecithin in bread production.

OVER the past twenty years commercial lecithin has been accepted as an ingredient in bread, biscuits, and flour confectionery. Its use has passed through several stages. In the first instance it was proposed as a substitute for egg yolk in flour confectionery, and although there is no doubt that it contributes to the properties of egg yolk (of which it is a major component) it is an ineffectual substitute.

The second stage was marked by the use of lecithin to replace part of the fat used in cereal products; world shortage of fats from 1939 onwards, in particular during the war years, did much to stimulate its sales as a baking ingredient. The third stage was reached with the realisation that, quite apart from its emergency function in replacing fats, lecithin has certain properties which enable it to claim a place in its own right in many baking formulae. This concept is not new—it was inherent in claims made in patents and in reviews twenty years ago, but the effective establishment of such claims has taken place only in the past decade.

During the "bread hearings" held at Washington to establish Federal standards under the U.S. Food and Drug Act, it became clear that lecithin was regarded by many bakers as a common raw material and it was agreed that it should be considered as a normal but optional constituent of shortening.

Literature on Lecithin

The use of lecithin in the production of bread and other cereal foods is now noted in the standard text-books[4, 10] on phosphatides and on soya bean derivatives, and has been subject of many patent applications, and of some review articles.[2, 8] Detailed investigations have been carried out in a number of industrial laboratories, and the experimental results obtained form the basis of publications by various firms which are engaged in the manufacture and distribution of phosphatides.

Nevertheless there are comparatively few published scientific studies of the function of lecithin in bread, cake, and biscuit making, and this is in part a reflection of the difficulty in obtaining conclusive and definitive results in the processes which are characterised by a very large number of variable factors—a general problem facing the scientific worker in the cereal field.

Variable Factors

The results obtained in American experiments on lecithin in relation to breadmaking must be interpreted with caution before they can be applied in Britain.

In the first place the commercial loaf as produced in the United States invariably includes fat (*e.g.* 3 or 4 lb. for each 100 lb. of flour) and often non-fat milk solids (*e.g.* 4 lb. per 100 lb. of flour); it is thus highly enriched compared to the typical and traditional commercial loaf in the U.K., a loaf composed essentially of four standard ingredients—flour, yeast, salt, and water.

A second reason for caution lies in the judging and scoring methods used. Such methods are still largely subjective in character and depend in great measure on the view-point of the observer—whether a professional judge or a member of a panel of housewives. There is ample evidence that opinions on good bread and cakes differ on opposite sides of the Atlantic, in fact local tastes and preferences vary in different parts of Britain; people in the north of England, for example, like a richer loaf than those in the south.

In investigations on breadmaking many variables have to be considered: (*i*) The source and type of the commercial lecithin, (*ii*) the method of addition, (*iii*) the type of flour used, (*iv*) other constituents of the dough, such as fat, sugar, milk solids, (*v*) the method of breadmaking used, whether short process or sponge process, (*vi*) the technique, whether small scale hand production or large scale plant production, (*vii*) times and temperatures used at the different stages—fermentation, intermediate proofing, final proofing, and baking.

Criteria for Use

From the standpoint of the baker there are two distinct, although allied, preliminary series of questions to be answered in regard to lecithin. (1) In what respect will it affect the breadmaking *process*? Will it help rather than hinder the already difficult problem of controlling this process? (2) What will be the effect on the final product? Will it produce a loaf with better appearance, taste, and flavour, and with better keeping qualities?

If the answers to these questions are positive, then subsidiary, but important, issues remain. In what quantities should lecithin be used, and are these quantities to be modified—if at all—with batches of flour of variable protein content and baking quality? In what form should lecithin be

added? What variations are required in the standard bread formulae and processes? What, if any, are the economic advantages?

A Better Loaf

In Table 1 a summary is given of the effects of fat and lecithin on the characteristics of the loaf, both immediately after baking and during storage.

Most observers agree that shortening of the tri-glyceride type produces a loaf with a more symmetrical shape, better external characteristics—a thinner and less tough crust, a better quality of colour and surface texture. The internal characteristics are also modified to give a better crumb colour, a greater evenness of grain or vesiculation and of general appearance, and what is perhaps most important—a softer crumb.

American evidence suggests that all the above effects can be reproduced or reinforced when the fat is supplemented or partly replaced by lecithin. Thus Pratt[6] in 1946 using a formula 4 per cent. sugar, 4 per cent. milk solids, and 3 per cent. fat examined the action of supplementary lecithin (0, 1, 0·25, 0·5, 0·75, and 1 per cent.—measured in relation to initial weights of flour) and concluded that 0·25 per cent. gave the best results in enhancing the effects of the fat, particularly in respect of crust properties, crumb texture and grain, and external appearance. In comparison with the fat-containing control, he suggested that "there was no effect on crumb *colour*, other than the *illusion* of whiteness brought about by finer cell structure."

Somewhat contradictory results have been reported regarding the effects of lecithin on loaf volume. Pratt's investigations suggested that lecithin produced little or no effect on volume over and above that produced by fat, but others have found that lecithin promoted an increase in volume. It seems likely that the question of final volume is intimately linked with the type of flour employed, and with the ability of the flour to take up water in the dough-making process.

Keeping Qualities

There seems to be general agreement that bread made with lecithin supplements not only has a softer crumb immediately after baking, but also has better keeping qualities as measured by the penetrometer. Thus Pratt made three batches of bread containing the following supplements:

	Fat *Per cent.*	*Lecithin* *Per cent.*
(*a*)	3	0
(*b*)	3	0·25
(*c*)	1	0·25

He found that the keeping qualities of (*b*) were better than (*a*), and that the keeping quality of (*c*) was approximately the same as (*a*); these results, in conformity with those of other workers,[7] provide the basis for suggestions that lecithin can be used for the partial replacement of shortening. Pratt, however, is of the opinion that lecithin should be considered primarily for its effect in improving the value and efficiency of the existing shortening in the bread formula, and that it should only be used to replace shortening when this is unavoidable because of short supplies of fat.

The desire of the public for a loaf with a softer crumb has encouraged the American baker (and in particular the plant baker) to produce a loaf with a crumb that will remain soft over several days. This has been the motive behind the extensive use in breadmaking of various surface-active agents such as mono- and di-glycerides, esters of ethylene glycol, and of sorbitol. In the "bread standards" recently announced in Washington, the glyceride esters are permitted as optional ingredients as shortening; the other esters are banned.

Softening Action

It is not at all clear from published information how far detailed comparisons have been made regarding the efficiency of lecithin, as a "softening" agent, in contrast to the glyceride esters and the glycol and sorbitol compounds, but it is probable that the effects produced by lecithin and by the other substances, all have a common origin, namely the surface-active properties, which can bring about a more even distribution of constituents and a modification of the granular structure of the loaf.

The lecithin may owe its beneficial effects on the keeping qualities of the loaf, in part to its ability to form loose compounds or complexes with other dough constituents (*e.g.* gluten or starch), in part to its ability to form surface layers around these constituents, and in part to its ability (as a lyophilic colloid) to hold water. Because of this characteristic it may help to preserve the structure of the fresh crumb, by retarding the movement of water, and the loss of water vapour from the starch gluten complex.

How far the softening action of the surface-active agents can be

TABLE 1

EFFECTS OF FAT AND LECITHIN SUPPLEMENTS ON THE FINISHED LOAF AND ON STORED PRODUCTS

Characteristics	*Fat Supplement*	*Lecithin Supplement*
A. External Characteristics.		
Volume.	Somewhat larger. Varies with flour.	Little effect on high fat formula, more pronounced in other cases.
Shape.	Improved.	Effect accentuated; more symmetrical loaf.
Crust.	Better bloom (better quality of colour and texture of surface).	Pronounced effect on crust; improved bloom.
B. Internal Characteristics.		
Grain or vesiculation.	Greater evenness of grain.	Accentuated.
Crumb colour.	Better crumb colour and sheen.	Apparent improvement—may be due to finer grain.
Nature of crumb.	Softer crumb.	Pronounced effect on crumb softness.
C. Storage.		
Keeping qualities.	Keeping qualities improved; crumb remains more soft than in control loaves.	Pronounced effect on crumb. Further improvement in keeping quality.

regarded as an "anti-staling" effect is not yet known; there are differences of opinion among cereal chemists on the precise meaning to be attached to the term "staling."

TABLE 2
EFFECTS OF FAT AND LECITHIN SUPPLEMENTS IN BREADMAKING
STRAIGHT-DOUGH PROCESS

Stage.	*Fat Supplement, e.g. 3 or 4 per cent.*	*Lecithin Supplement, e.g. 0·25 per cent. In addition to fat.*
A. Mixing of flour and and other ingredients.	Slightly softer but less sticky dough; water absorption may be increased.	Similar but more pronounced effects.
B. Fermentation.	High percentages may produce retarding effect; longer fermentation time required.	Little effect.
C. Dividing and handing-up.	Improves handling properties. Dough better able to withstand "felling" and rough treatment. More resilience, less tendency to tear.	Definite improvement in handling properties, and increase in resilience. Dough less sticky.
D. Intermediate Proof.	Less tendency to stick to pockets. Less tendency to skin at surface.	Effects accentuated.
E. Final Moulding.	Resilience to moulding action. Good skin which gives good shape.	Effects accentuated.
F. Final Proof.	Probably greater tolerance.	——
G. Baking.	Some reduction in baking temperature advisable.	——

The Breadmaking Process

The action of both tri-glyceride and lecithin supplements can be seen at different stages in the breadmaking process whether this can be carried out by the straight-dough (see Table 2) or by the sponge method.

Perhaps the most valuable contribution of fat and of lecithin is to improve the "handling" properties of the dough. This is important to the family baker engaged in the hand production of bread and whose skill in his craft depends in great measure on his ability to control the treatment of the dough. The modifying action of fat or lecithin is even more welcome to the plant baker who adjusts his machinery to a time schedule and who endeavours to work with doughs of standard types. The greater resilience produced by fat or lecithin supplements enables doughs to stand up to harsher mechanical treatment, without any damage to their structure.

A second significant effect of the supplements is the improvement of the surface or "skin" of the doughs; this results in greater ease of working, in that stickiness is reduced, and it also contributes to the final shape of the loaf, giving a more symmetrical external appearance.

The question of the influence of fat and lecithin on water absorption during the mixing stage, is complicated by the great variations that can occur with flours of different origins. It would appear that with certain flours, the normal water absorption can be increased with a consequent enlargement in the volume of loaf.

The Mixing Process

Detailed studies have been made on the action of supplements on the mixing process; the *subjective* observations made by experienced bakers on the consistency and "feel" of different doughs, have been followed up by *objective* measurements using the standard recording machines that have been available in recent years. It is well known that the behaviour of a flour in a mixer is contingent on the quality of its major protein component—gluten—and the quantity and quality of the gluten varies with the source of the wheat. Both fat and lecithin[5, 9, 11] have favourable effects on the gluten, and the lecithin in particular has a "mellowing" action, increasing the tolerance of the dough to mixing and thus improving the mixing qualities.

The same idea has been expressed by saying that lecithin will produce a "neutralisation of the extremes of weakness and strength" in flours, altering high and low protein flours in converging directions. This action of lecithin appears to be over and above that of the fat and has been explained in various ways, for example as a "lubrication" effect, brought about by the surface-active properties, which may enable the dispersed phosphatide to cover effectively the gluten strands.

Use of Lecithin without Fat

The American conclusions regarding the advantages of lecithin and regarding the optimum amounts are based largely on a comparison of bread made with fat and lecithin supplements and bread made *with fat*, but *without* lecithin. Lecithin when added as a supplement to fat has two main advantages in breadmaking; in the first place it assists in the control of the process, and secondly it produces a better loaf with better keeping qualities.

It is not unreasonable to suppose that the above advantages may, with certain provisos, be all the more obvious in bread of the more traditional type, *i.e.* made without the addition of fat, milk powder, and sugar. Although the published information on this question is limited, there is evidence from commercial practice in Germany and in the Netherlands that from 1930 onwards lecithin has been accepted as an important supplementary ingredient. Investigators in the Netherlands found that lecithin was particularly useful as an adjunct to the very soft flours produced by the incorporation in the grist of home-grown wheat. Comparisons of such flours, with and without lecithin, showed that up to 10 per cent. more water could safely be employed in the presence of the lecithin supplement, and this increase was reflected in the volume of the baked products.

Similar observations were published in 1934 by Bennion,[1] whose preliminary experiments demonstrated the effect of lecithin on water absorption and loaf volume. Hutchinson[3] (1936) in

his report from the Research Association of the British Flour Millers placed lecithin in the category of bread improvers, and noted the improved keeping qualities of the bread produced. Similar results were obtained by Rewald.[7]

Recent investigations (unpublished) carried out by the author and his colleagues, have shown that good results can be obtained by the incorporation of 0.3 per cent. of lecithin in doughs made from present-day 80 per cent. extraction National Flour; improvements in the handling qualities of the dough, in the final loaf volume, and in the colour and softness of the crumb are apparent.

The question of crumb colour is of particular interest at the present time in that 80 per cent. extraction flour gives a crumb which is darker than that from flour of the pre-war extraction rate of 70-72 per cent. It has been demonstrated that the National Flour, when supplemented with fat (*e.g.* 1 per cent.) and subjected to high speed mixing, will often produce a much lighter crumb. This is almost certainly not a bleaching effect, but rather an optical illusion brought about by the finer structure. Similar observations have been made in experimental work on lecithin in relation to National Flour.

Addition of Lecithin

Several methods have been proposed for the addition of lecithin to doughs including: (i) the use of lecithinated flour, (ii) the use of shortening in which lecithin has been incorporated, and (iii) the use of lecithin emulsions. All three methods have their place in bakery practice, but clearly the second method (common in the United States) is primarily designed for fat-containing doughs. Under English conditions the third method is likely to prove most useful, the commercial lecithin in a suitably emulsified form being added at some stage in the mixing process.

The figures given in the literature for the amounts of lecithin to give optimum results, can only be interpreted if information is available regarding the percentage of lecithin and other phosphatides in the commercial preparation used. Thus an emulsion of lecithin-oil suitable for bakery practice may contain only 40 per cent. of phosphatide, the edible oil being in part a diluent to facilitate the addition. However, lecithin, like other flour supplements, is self-limiting in action, and the amounts recommended by manufacturers can usually be taken as a guide to economical as well as to efficient use.

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(To be continued)

Correspondence

To the Editor of

FOOD MANUFACTURE

Copper in Foods

DEAR SIR,—I should like to refer to your editorial on copper in foods on page 264 of the July issue of your journal. In general, it is not customary for members of a Committee to defend their actions, but, before the Food Standards Committee set out its views on the quantities of copper to be permitted in food, one of its members, Dr. G. W. Monier-Williams, had written a small volume on Trace Elements in Foods, and had devoted the first 63 pages to this important metal. Dr. Monier-Williams points out that copper appears to be a natural constituent of many foods, such as tea, cocoa, and crustaceans, and also takes the trouble to inform his readers that no copper is extracted from the tea into its infusion.

In the good old days it was customary to take pride in the large open evaporating pans used in food and pharmaceutical factories and these would be given a delightful polish at least once a week, but it is now realised that not only did the employees give these a polish, but that the pans themselves yielded considerable quantities of copper to the extracts prepared in them. Some years before the last war, it was discovered that tomato purée, yeast extract, and similar products derived practically the whole of their copper content from these old fashioned copper pans and that with improved manufacturing plant better extracts, almost free from copper, could be obtained. It was for this reason that Port Medical Officers first decided to restrict the quantity of copper, which they would approve in imported tomato purée, and the Food Standards Committee has been even more lenient than the Port Medical Officers of Health.

While little is known about the quantities of copper that the animal system can absorb with impunity, it would appear that the Committee have been minded to allow copper to be present in foods, where it occurs naturally or where the use of copper-containing fungicides are the most satisfactory methods of dealing with certain conditions, but to prohibit its presence as far as possible where this presence is unnecessary. It was on account of the argument that the copper in tomato purée was caused by copper fungicides and not by copper pans that action to prevent its presence was delayed, but tomato plants, like grape vines, should be sprayed with fungicides at certain times in order to avoid contamination or even spoilage of the quick growing fruit.

Yours faithfully,

THOMAS MCLACHLAN.

London.

TO AUTHORS

FOOD MANUFACTURE is prepared to consider the publication of articles on the subjects covered. Books on food would also be considered.

Standards for Saccharin Tablets

THE Food Standards Committee have reviewed the existing temporary standards for saccharin tablets.

The Saccharin Order, 1949 (S.I. No. 945), prohibits with certain exceptions the retail sale of saccharin products other than "standard saccharin tablets" which are defined as follows:

> "Standard saccharin tablet" means a tablet that
> (i) weighs not more than 1·1 grains, and
> (ii) contains not more than 5 per cent. by weight of water-insoluble matter and not less than 0·18 of a grain and not more than 0·22 of a grain of saccharin mixed with sufficient sodium bicarbonate to render the saccharin soluble with or without other excipients, or an equivalent amount of soluble saccharin with the addition of sodium bicarbonate or other excipients.

The Order also requires that all such tablets sold by retail shall be sold in packets labelled to indicate the number of tablets in the pack and the content of saccharin in each tablet.

These provisions were introduced during the war to protect the consumer from the sale of low strength tablets.

The Committee invited evidence from the manufacturing trade. The trade considered that in present conditions a standard should be maintained; sales of saccharin tablets were still comparable with war-time levels, and unless a standard were fixed there would be no protection for the consumer against the sale of inferior articles. Sales in future would depend upon sugar supply; when sugar supplies became normal, the demand for saccharin tablets would fall, but would nevertheless be greater than pre-war. The trade would accordingly welcome the perpetuation of a standard.

The trade deprecated any alteration in the above standard. The public had become accustomed to the use of these tablets and had found them more convenient than the 0·3 grain saccharin tablets on sale before the war. If, however, tablets of different sweetening power were to be allowed, the differences in the weights and sizes of the tablets should be so noticeable as to be obvious on sight.

Having considered the evidence offered by the trade, the Committee have reached the following conclusions:

> (*a*) A standard for saccharin tablets should be maintained so long as sugar remains in short supply. Saccharin has no nutritional value and as sugar becomes more plentiful, the domestic demand for artificial sweeteners will decrease; the need for a standard could therefore be reviewed when sugar rationing ends.
>
> (*b*) There should be no change in the present sweetening strength of "standard saccharin tablets" which might in future be described simply as "saccharin tablets."

The Committee think it desirable that the standard should be framed so as to cover the sale of all sweetening tablets containing saccharin as an ingredient, even if they contain also other synthetic sweetening agents. They are advised that this could be achieved by making the standard cover "saccharin tablets and other sweetening tablets containing saccharin." Such a standard would not apply to sweetening tablets not containing saccharin, and if necessary these would have to be dealt with by other means.

The Committee therefore recommend that the standard for saccharin tablets should be maintained and extended to cover "saccharin and other sweetening tablets containing saccharin," and that the provisions with regard to packaging and labelling should be continued; the term "standard" saccharin tablets need no longer be used.

They suggest that the standard for saccharin and other sweetening tablets containing saccharin, prescribed in the way mentioned above, should be as follows:

> A saccharin or other sweetening tablet containing saccharin
> (i) shall contain not less than 0·18 grain and not more than 0·22 grain of saccharin or the equivalent weight of soluble saccharin;
> (ii) may contain as excipient sodium bicarbonate with or without other suitable substances. The total amount of excipient shall not exceed four times the maximum quantity of saccharin;
> (iii) shall not contain more than 5 per cent. water-insoluble matter, nor less bicarbonate than that required to render the saccharin completely soluble.

The Torry Fish Smoking Kiln

MANY firms in the industry are now installing the Torry Research Station kiln for producing smoked fish. They are mainly the large scale producers and it has become apparent that there is a need for a scaled down version of the original design. Full details of a kiln which is suitable for the small scale producer of smoked fish are given in a booklet* recently issued. It will cure about ten stone of fish in four hours. A high degree of uniformity in all the conditions required to give an evenly cured batch of fish is obtainable without effort, and all the usual cures can be prepared.

The smoke for the kiln is produced in a special furnace outside the smoking chamber. Mixed with air, the smoke is sucked by a fan into a duct over the top of the kiln and propelled along it. It is then diverted vertically down one end of the kiln and through louvres to pass horizontally through the smoking chamber. At the other end of the smoking chamber the smoke is sucked by the fan through louvres and is partly ejected up a chimney and partly re-circulated. Adjustable vertical partitions in the duct and the special spacing of the louvres are points in the design that make for evenness in the smoke distribution. Thermostatically controlled heaters in the duct maintain the temperature of the smoke.

For ease of handling, the fish are smoked on trolleys which are designed to support the usual tenter sticks. The fish are always free from smuts, etc., and cannot be wasted by dropping off the tenters into the fire.

In addition to the construction of the kiln, the fish trolley and smoke producer are described in detail, with diagrams and photographs.

* *A Ten Stone Controlled Fish Smoking Kiln. Food Investigation Leaflet* No. 14. Pp. 6. H.M.S.O. for the D.S.I.R. Price 9d.

A street scene in Volendam.

Transport by waterway.

Food and Agriculture Groups in Holland

SOME fifty members of the Food and Agriculture Groups of the Society of Chemical Industry assembled at Liverpool Street station on May 23 and arrived at Amsterdam bright and early the next day. With characteristic enthusiasm, they were out and about in little more than an hour after reaching their hotel.

To those who had not previously visited the country, it was evident that there is in Holland a life unknown elsewhere; it is life on the water. At all spots where nature had forgotten to place rivers or streams, Dutch industry has made canals. These waterways lead, not merely from one town to another, but even to each village—it might almost be said to each country house, and such an arterial system could not fail to be extraordinarily favourable to the circulation of produce. The services rendered elsewhere by carts are here performed by boats; the gardener himself takes his boats laden with vegetables, fruit, or flowers, to market.

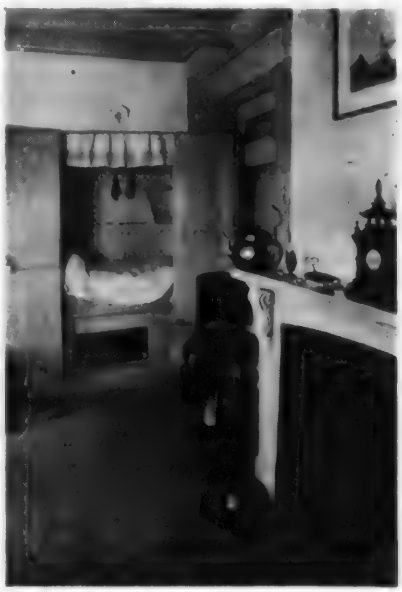
The Flower Market

On Saturday morning members made their way to the flower market at Aalsmeer where auction sales are held. This is a town of 20,000 inhabitants, mainly engaged in the cultivation of flowers grown under glass. Pot and cut flowers as well as bulbs are sold in the market, 90 per cent. of the flowers being sold in Holland and 10 per cent. exported. For bulbs, these figures are reversed.

Sunday Excursion

On Sunday, an all-day excursion by coach and boat was made, first to Broek in Waterland, a charming lakeside village. Here was visited an old-type farmhouse divided into living quarters, stable, and dairy, where Edam cheeses are made. Thence to Monnickendam where the beautiful tower of the old town hall built in 1591 to commemorate the expulsion of the Spaniards from this fishing village was much admired.

Lunch was partaken at the Hotel Spaander at Volendam, a village on the Zuider Zee which flourished at the time of the East and West India Company. There are now some 8,000 villagers engaged in fishing. During the return journey to Amsterdam, Edam was visited, where the familiar red Dutch cheeses are made.



A typical Dutch interior.

One member of the Group, impressed by the way in which the names of Edam and Gouda are pronounced, composed the following as an *aide-memoire*:

A " pedigree " heifer of Edam
Was full of good points and displedam
With studied effect,
So that none would detect
That she'd had a black sire and a gredam.

A feckless young woman of Gouda
Mislaid both her lipstick and pouda,
And was thereby confined
To showing mankind
The face with which God had endouda.

Quick Freezing Factory

The serious business of the tour began on Monday morning, the party being split into two groups, the first visiting the N.V. Diepvries at Zaandam, where the quick freezing of a large range of foods is carried out. Complete joints of meat are immersed for a few minutes in hot fat and are then quick frozen. In addition to meat and vegetables, complete prepared dishes are also quick frozen.

The party was shown an interesting range of the constituents of a meal which turned out to be identical with the magnificent lunch offered by the hosts, Mr. and Mrs. Bouwmeester.

The hosts were thanked in a felicitous speech by Dr. J. R. Nicholls.

The older generation.

The younger generation.

Biscuits and Rusks

In the meantime, the second party visited the main factory of Koninklijke Verkade Fabrieken N.V., manufacturers of biscuits and rusks.

On arrival at the factory, the party was welcomed by Mr. Norman Verkade, his brother Arnold, and Dr. Seeder, chief chemist, after which a tour of the rusk making section was made and it was possible to follow the complicated sequence of operations from the fermented dough stage to the wrapping of the finished rusks in Glassine paper.

Proceeding to the biscuit making department, there was seen the new band oven built in four sections, each fired on the cyclotherm principle, the cooling band of which was reversed into the hot space over the oven, giving graded cooling and providing additional travel.

A visit to the laboratory appealed to those who were interested in scientific bakery control. Dr. Seeder, a physicist of outstanding ability, demonstrated instruments devised by him for the testing of flour, finished products, and packaging materials. One of these instruments recorded automatically the gas production and gas retention of a dough, while another recorded its elasticity and extensibility. This latter was similar in principle to the Extensograph but had some novel features. Another ingenious instrument devised by Dr. Seeder was one for measuring the strength or "cutability" of rusks.

The Verkade hospitality did not end on leaving the factory as the party was taken by motor launch further up the river and given a typical Netherlands lunch in one of the old houses overlooking the water.

Dr. A. J. Amos expressed the gratitude of the visitors to Messrs. Verkade.

Spirits and Liqueurs

During the afternoon both parties visited the establishment of Erven Lucas Bols, distillers of spirits and liqueurs. In addition to the universally known Bols which is partaken of from China to Peru, the firm makes a number of liqueurs among which one of their biggest sellers rejoices in the glamorous name of "Parfait Amour." A number of the company's excellent products were sampled at the cocktail party which followed.

Netherlands Chemical Society Reception

After dinner, a reception was given by the Netherlands Chemical Society at the Royal Tropical Institute. Professor H. J. C. Tendeloo, President of the Society, received the visitors, and in a short speech welcomed the party and described the work of the Society. Professor Kay replied on behalf of the visitors, who had the honour and pleasure of meeting Professor Dr. Hardon, President, Amsterdam Section, Dr. J. A. Klaassen, Vice-President, Amsterdam Section, and the Secretary, Dr. T. van der Linden, and a large number of other eminent chemists.

Essences and Synthetics

On Tuesday morning half the party travelled to Zaandam and a cordial welcome was given to them by Mr. Schwarz, director of Messrs. Polak and Schwarz Ltd., manufacturers of essences, synthetics, and perfumery chemi-

Members of the Group start one of their water journeys.

An old type farmhouse where Edam cheeses are made.

cals. The head office and many laboratories of this company are situated at Zaandam, and the layout and hygienic conditions were noteworthy. Both the essence and perfumery laboratories proved to be of great interest to all members of the party, and the storeroom and packaging departments revealed the wide range of products manufactured by this firm.

After an excellent lunch in Amsterdam, presided over by Mr. C. Brummer, the party then travelled to Hilversum, where the production centre of Polak and Schwarz is situated. In the essence factory, particular attention was paid to the process of ginger pressing and also the concentration of blackcurrant juice. The latter operation was particularly noteworthy as in a newly developed machine the juice is concentrated to one-tenth of its volume in 30 seconds. Vanillin is a major product and is prepared from clove oil. The production of aromatic chemicals and isolates covers the complete range of such materials. A variety of reaction vessels were inspected by the party.

Other laboratories are situated at Hilversum, and the research laboratory in particular attracted much attention. On the way back to The Hague, the party called in at Mr. Brummer's house, which social interlude rounded of a most interesting visit.

Meat Canning

The second group visited the meat canning factory of E. Noack, Ltd., and were received by the two joint managing directors Mr. de Rek and Mr. Gast, Mr. Osman Jones (consultant), Mr. and Mrs. Berendse, Dutch representatives of Messrs. Lovell and Christmas, and by other members of the staff. A very large range of meat products was being prepared or canned, among which were many types of sausage, bacon and ham, ox tongue, as well as a number of prepared dishes such as Hungarian goulash, fried pork cutlets, fried veal cutlets, and pigs feet in jelly.

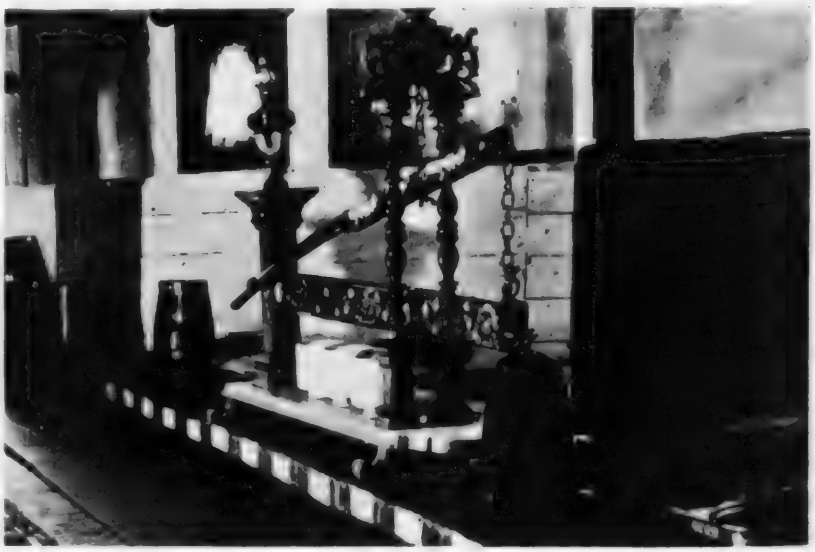
An item of special interest to members concerned with meat canning was the filling of the vacuumed cans with nitrogen before sealing. The use of nitrogen is not new, and this procedure has been used for such commodities as coffee, dehydrated vegetables, etc.; but the members had not seen it in use before in a meat factory. Eighty per cent. of the firm's products is sent to practically all countries of the world.

Mr. de Rek made a speech of welcome which was replied to by Mr. Osman Jones. The charming wife of Mr. Berendse also spoke, after which Dr. Magnus Pyke thanked the hosts for their hospitality. He paid tribute to the long friendship between Britain and the Netherlands, and added that we thought so highly of the Dutch that even when we were beaten by them, we still considered them almost our equals!

From Food to Soap

In the afternoon the group visited the Co-operative factory at Utrecht, where they were received by Dr. Bos and shown round by Mr. U. van Veen, personnel manager, and Mr. J. A. Scherpenisse, chemist.

This remarkable organisation makes a large range of products from food to soaps, the latter department covering washing powders and wax polishes. Passing through the bakery department,



An antique Edam cheese press.

the high efficiency of the biscuit cutters impressed, as did the equipment concerned with the manufacture of custard powders and puddings.

Chocolate and Cocoa

On Wednesday one group visited the Van Houten and Zoon chocolate and cocoa factory at Weesp. The party was welcomed by Mr. van Mesdag and was served with the traditional cup of cocoa.

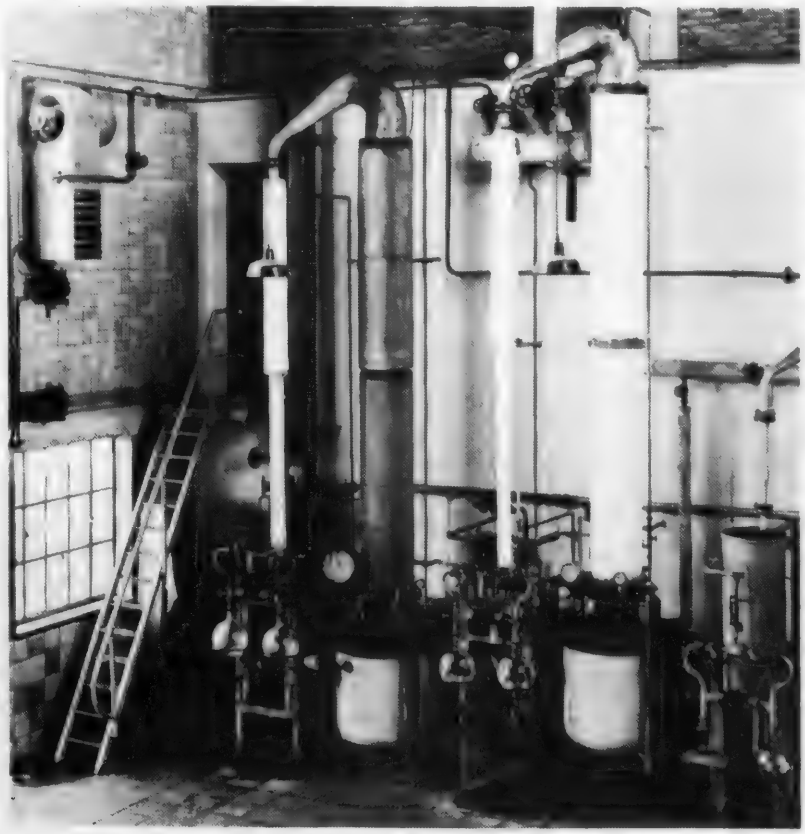
The factory was toured under the guidance of Messrs. Goedewaagon, Nauta, and Metselaar.

The tour started where the initial cleaning and grading of raw beans and their transference to the winnowing and de-germinating machines was being carried out, and so through the various manipulations resulting in the ground, bagged cocoa and the packing of cocoa butter.

A Dual Purpose Enrober

In the chocolate factory there were seen two plants for the manufacture of chocolate bars, one making 1 oz. cream filled bars and the other 4 oz. blocks of milk chocolate. There was also seen an enrober for coating chocolate centres in starch moulds. This machine served a double purpose; trays of centres set in starch, which had been deposited the previous day, were fed into the machine, and after the centres had been removed, the starch was re-moulded in trays and passed to the other end of the machine where fresh fondant was deposited.

Inside the Verkade biscuit and rusk factory.



Part of one of the Polak and Schwarz distillation halls.

An expression of thanks was given to the hosts by Mr. A. N. Harrow.

Diamond Cutting

The diamond factory of Asscher N.V. was visited by the second party. It was here that the famous Cullinan diamond was cut and polished. After a preliminary study of six weeks, the operation took ten months to complete. Diamond cutting was seen, an interesting feature of which was the paper-thin disc made of copper/phosphorus alloy, the abrasive

Inside the meat canning factory of E. Noack, Ltd.

used being olive oil and diamond dust.

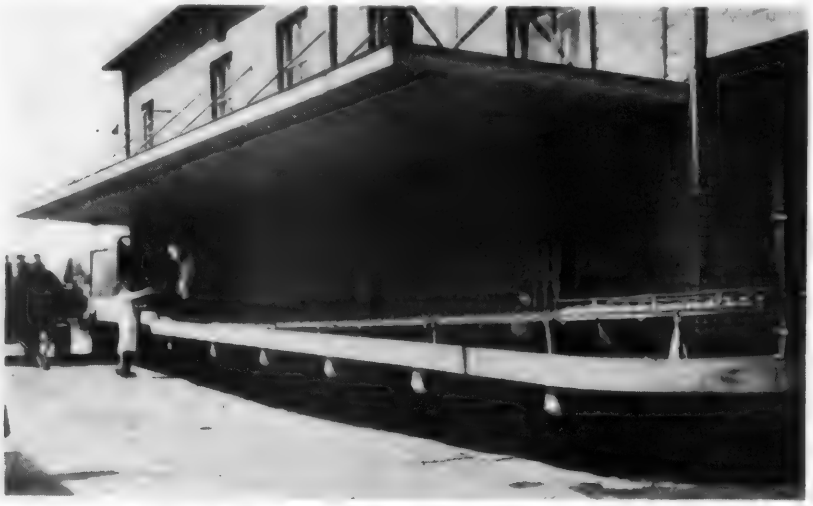
Cheese and Horticultural Research

On Thursday a visit was made to the De Producent cheese factory at Gouda. The co-operative movement was first started to sell farm milk and home-made cheese, this resulting in their being the sole sellers of milk. Milk production is gradually rising, but is being held up by the five year plan to abolish TB and the consequent slaughter of many of the good yielders.

The open vats in the cheese factory are made of stainless steel and looked very impressive. The organisation has normally 1,200 tons of cheese in store at all times. The milk bottling plant is of standard type, and milk, flavoured with vanilla, coffee, chocolate, etc., are favourite products. After lunch, Mr. Leonard Hill thanked Mr. van Wignen for the hospitality and commented on the progressive spirit of the organisation.

In the afternoon members left Amsterdam and arrived at the Hotel Kurhaus, Scheveningen, after which the Institute for Research on the Storage and Processing of Horticultural Produce at Wageningen was visited.

The work of the Institute is similar to that of Long Ashton and to the Institute at Palma, visited by the Groups while in Italy last year. Its aim is to obtain increased yields of produce, and work is in hand on fruit juices, wine, canning, and frozen fruits. Laboratories are now being equipped with modern pilot plants for most of the processes associated with the various operations being studied. Members were impressed by the excellent models of gas and coal storage rooms. There is close co-operation between the group of establishments, of which the Institute is one, and those of other countries. At the conclusion of the visit, Professor Kay thanked Professor A. K. Zweede and other officials of the Institute who had given the group such a kind reception.



The reception bay of the De Producent cheese factory.

Lager Beer Brewery

On Friday morning the party visited Heineken's Brewery at Rotterdam, and were received by the head chemist, Dr. F. Mendlik.

The company has achieved an international reputation. The pioneer work of Hansen in Copenhagen in developing pure yeast cultures so fundamental to the bottom fermentation system is being continued by Dr. Elion at Rotterdam.

The party was first taken to the maltings, carried out on the box system, and saw the malt growing and a kiln in process of loading. They were also shown the mechanical handling and storage arrangements for the finished malt. From there the first stage of lager brewing was seen, this being carried out by the decoction process in contrast with the British system of infusion. The primary stage of the cooling was inspected, this taking place in large open vessels and completed in a modern form of plate heat exchanger.

One of the fundamental processes of lager brewing is the maintenance of the culture yeast. In lager brewing there is not that natural selection which occurs in top fermentation, which, under suitable conditions, makes its own culture system, nor does bottom fermentation automatically include the means of limiting the development of less desirable forms of primary yeast which can arise. The yeast of a lager brewery is developed from pure culture in the laboratory, thence to a plant which produces sufficient for a normal size brew.

During lunch in the brewery the party was given an opportunity to

Concentrating pilot plant at the Horticultural Research Station.

sample the products, and at its conclusion Mr. H. J. Bunker expressed the appreciation of the Group to Messrs. Heineken's.

Yeast and Antibiotics

In the afternoon the party was received by Professor and Mrs. W. H. van Leeuwen and Director F. G. Waller at the K. N. Gist-en Spiritusfabriek, N.V. at Delft, where a complete model brewing plant was shown and a demonstration on malting was given by Mr. Waller.

This old-established firm supplies most of the yeast used in the Netherlands, and conducts a flourishing export business. Penicillin is produced in a separate plant in this vast organisation.

The Last Function

The farewell dinner given by the Groups to their Dutch hosts was held at Scheveningen. Mr. A. L. Bacharach was in the chair as Professor Kay had been obliged to return to England. Mr. Bacharach apologised for the unavoidable absence of the chairman of the Food Group, and thanked those concerned for their hospitality. He explained the role of the Food Group as the international stormy petrels of the Society of Chemical Industry. He concluded with historical sketches of many past and present distinguished Dutch chemists, and then proposed the toast of the Netherlands Chemical Society. Dr. Tendeloo in his reply expressed pleasure at seeing so many distinguished visitors.

Mr. Leonard Hill in a final speech briefly outlined the nature of the work of the visitors, with light-hearted references to some of the national characteristics of its constituent members. The same speaker proposed the health of the guests, covering some of the Netherlands history, little known in England, and referred to the sympathy felt there for the present situation, touching Indonesia and Holland, and to the great work of colonisation performed by the Dutch in the East Indies and elsewhere.

Those taking part in the tour were: Dr. and Mrs. A. J. Amos; Mr. and Mrs. J. Andrews; Mr. and Mrs. A. L. Bacharach; Mr. and Mrs. H. F. Barnes; Mr. and Mrs. L. F. Barron; Mr. and Mrs. F. K. Birkett; Mr. A. P. Buchanan; Mr. H. J. Bunker; Mr. and Mrs. S. W. Butterworth; Mr. W. G. Carey; Mrs. H. E. Cox; Mrs. J. G. Davis; Mr. A. H. Dodd; Miss P. Dodd; Dr. and Mrs. G. M. Dyson; Mr. A. N. Harrow; Mr. W. L. Hill; Professor H. D. Kay; Miss M. A. Longstaffe; Mr. R. D. Mason; Mr. and Mrs. H. Mears; Dr. and Mrs. R. Milton; Mr. and Mrs. H. C. Moir; Mr. and Mrs. R. H. Morgan; Dr. J. R. Nicholls; Mr. and Mrs. R. J. Nicholls; Mr. R. J. Munro; Dr. and Mrs. J. H. Oliver; Mr. W. E. Rhodes; Mrs. M. T. Travers; Dr. B. V. de G. Walden; Mr. C. E. A. Wescott; Mr. and Mrs. J. B. Wilton; Mr. and Mrs. C. E. Wiseman.

Members of the Group leave their coach for a factory visit.

Our Contemporaries

Articles published in the associated journals of the Leonard Hill Group this month include the following:

"Automatic Control in the Process Industries," Part II, by A. Pollard, B.Sc., A.R.I.C. (*Chemical and Process Engineering*).

"Acid Based Chemical Indicators," by H. A. Fisher, D.Sc.; "Anti-convulsant Drugs," Part II, by H. R. Fleck, M.Sc., F.R.I.C.; "Crystallisation," by A. W. Bamforth; and Progress Reports (*Manufacturing Chemist*).

IMPORTANT ANNOUNCEMENT

FROM August 22, 1952, the address of Leonard Hill Ltd., will be **Stratford House, Eden Street, London, N.W.1.** Telephone EUSton 5911 (10 lines).

The World Food Situation

IN the course of his Presidential Address at the Sixth Annual General Meeting of the British Food Manufacturing Industries Research Association, Sir Frank Engledow, C.M.G., F.R.S., gave some interesting facts on the world food situation.

For twelve austere years food had been a national problem; many recent reports and books presented it as a universal threat. Nearly all the food in the world was eaten by the people who grew it. Probably only 4 per cent. of the crop foods and 2 per cent. of the foods from animals came on the world markets. There were two ways of increasing world supplies: by higher yields and by bringing more land into agricultural use. How much it was possible or economical to produce from any stretch of land or whether it was worth bringing into agriculture at all was ultimately settled by climate, soil, and topography. These were outside man's control, but many agencies, such as chemical fertilisers, better husbandry, breeding new strains of crops and livestock, and checking diseases and pests, present yields could be raised.

Agriculture had attained its greatest advances in the old lands of Western Europe and in the "new lands" of the Americas and the Antipodes, developed by Europeans in the past century and a half. In these "new lands" expanding industry was steadily augmenting the food demand, especially for meat and other protective foods. Recent experience had forewarned Britain of the effects of this development on food exports.

At present, it seemed probable that less than 10 per cent. of the world's land surface was farmed. Broadly, 22 per cent. was unusable because of extreme cold and 16 per cent. was desert; 17 per cent. allowed no more than the scantiest grazing; on 26 per cent. crop and livestock production was possible although rainfall was both low and uncertain; of the remaining 19 per cent. parts in the temperate zones were good for farming, most of those in the tropics and sub-tropics being fully usable but less good. Although the 19 per cent. of climatically good world regions constituted a prodigious acreage, rocky soil, mountains, steep hills, and other natural circumstances precluded as much, perhaps, as one half from farming use.

Referring to the immediate prospects, Sir Frank said that Britain would have to rely heavily on its own small acreage, made smaller every year by about 50,000 acres for building and other uses. In terms of physical possibility, to raise our agricultural output by 15 per cent. over the 1951 level would be no great thing; a rise of 25 per cent. by no means visionary. As to the outlook, apparent world trends in food production and population were disquieting. In the coming decade, simple quantitative inadequacy of food might be hard to avert. With foods of specific nutritive importance matters were likely to be worse. Shortage of some commodities or displacement of one by another might affect food manufacturing processes. Vigilant reconnaissance, one of the duties of the Research Association, must be kept up.

The Chairman, Lt.-Col. G. R. Harding, D.S.O., M.B.E., in his Report, said that as he was now retiring from office after four years, he felt he should give an account of his trusteeship. Many members present would recall that the year 1947 marked the amalgamation of the two then existing Associations and the inclusion of the whole of the food manufacturing industry, other than flour milling and baking. His immediate predecessor, Mr. Mathieson, was more than largely responsible for bringing about that change which had undoubtedly been most beneficial.

Appeals made to members for donations to the Land, Equipment, and Building Fund had met with generous response. The position at the moment was that about £76,000 had been donated or promised, and to this the D.S.I.R. were contributing some £38,000. With interest of £2,000 from temporary investments, etc., the total was approximately £116,000. On the expenditure side, a total of just over £123,000 had been spent on land, building, and equipment, leaving a deficit of about £7,000. Members would agree that as a matter of sound financial policy this adverse balance should be cleared by further donations.

The Association still had contact from time to time with Dr. L. E. Campbell, the former Director of Research, who was still actively concerned with food production. Turning to the future, the Chairman said that in Dr. F. H. Banfield the Association had a Director greatly respected by all who had come into contact with him and who could be confidently relied upon for further developments in the respective fields of food research.

Sir Frank Engledow and Mr. J. G. Mathieson (Clarnico, Ltd.) were re-elected President and Vice-President respectively, and Colonel Harding, who was retiring from the Chair, was elected a Vice-President of the Association. The following, due to retire from the Council, were re-elected: Mr. H. O. Barratt (Barratt and Co., Ltd.), Mr. A. E. Burdett (Fuller's, Ltd.), Mr. F. N. Hetherington (Batger and Co., Ltd.), Mr. R. S. Worth (The Nestle Co., Ltd.), Mr. H. Threadgold (Wm. P. Hartley, Ltd.), Mr. M. G. Abrahams (Excel Co., Ltd.), Mr. E. E. Marsh (Marsh and Baxter, Ltd.), Mr. J. E. Tulip (Tyne Brand Products, Ltd.), Lt.-Col. Sir C. V. Jones (Foster Clark, Ltd.). Mr. Colin S. Dence (Brand and Co., Ltd.) was elected to the Council.

At the Council Meeting following the Annual General Meeting, Mr. E. E. Wells (Rowntree and Co., Ltd.) was elected Chairman for the ensuing year, and Mr. W. B. Chivers (Chivers and Sons) was elected Deputy Chairman.

Bacteriological Standards for Perishable Foods

It is probable that in no branch of laboratory control is technique of more importance than it is in a modern bacteriological laboratory endeavouring to apply bacteriological standards to perishable foods. These were the final words of Prof. H. D. Kay's Presidential Address which formed the introduction to the Food and Nutrition Section of the Royal Sanitary Institute's recent Health Congress at Margate.

FOUR papers were presented during this section of the Congress dealing with various aspects of the subject, the first of which, read by W. Price-Davies, B.Sc., A.R.I.C., dealt comprehensively with the position in America in relation to food laws and their administration.

The responsibilities of the various Federal agencies concerned with food control and the liaison between these agencies and State and local food authorities were defined.

On the subject of standards, Mr. Price-Davies said that the question whether bacteriological standards should be included in the Definitions and Standards for Food of the Federal Food and Drug Administration was not easily answered. That they were not might well be due to the fact that it was not absolutely necessary to include such requirements in a standard of identity for food, that the bacteriological condition of food entering inter-state commerce was covered by other sections of the Federal Food, Drug, and Cosmetic Act of 1938, and that no workable bacteriological standards for food had been developed.

From a study of this Act, it was obvious that the Food and Drug Administration had placed major importance in controlling the bacteriological contamination of food on the right of plant inspection, in view of the fact that contamination of food with micro-organisms might be injurious to health, and that such injurious nature could not be adequately determined after the articles had entered commerce.

Defining Regulations

Some of the difficulties involved in defining such regulations had been discussed by Dr. G. Slocum, chief of the microbiological division of the Federal Food and Drug Administration, his experience having shown that a plate count might bear little relation to the hygienic quality of the food and that the same objection held for the coliform tests, *i.e.* that as these organisms were able to multiply abundantly in the food, the number present at the time of examination could not be correlated with the degree of original contamination.

Having briefly discussed the special problems connected with bacteriological standards for meat and milk in the United States, Mr. Price-Davies described the recent work of the American Public Health Association who had published tentative methods for spices, fermented food, fruit juices, meat and meat products, and frozen foods. These had been widely accepted by industrial and Government bacteriologists and had been used in improving sanitation practices in the food industry.

The advances made in the bacteriological control of manufactured foods had been owing not to the establishment of bacteriological standards, but by placing primary emphasis on the sanitary or operating standpoint. To illustrate this, Mr. Price-Davies reviewed the research carried out in connexion with the dressing of poultry.

Manufactured Meats

The second of the four papers, read by C. L. Heller, Ph.C., M.I.Biol., dealt with bacteriological standards for manufactured meats, and said that to consider them it was necessary to possess a knowledge of the many micro-organisms which might contaminate food and an understanding of the nature and consequence of their growth.

While it was not possible to assess accurately the number of incidents of bacterial food poisoning and the quantity of food wasted through microbial spoilage, it was obvious that avoidable incidents of spoilage and food poisoning due to microbial action were not infrequent, and the question was whether these might be avoided by the application of microbiological standards.

A precise definition of a standard would have to specify (*a*) the type of organism to be limited, (*b*) the location of the limit, and (*c*) the methods of analysis. Since there were many kinds of meat products differing in composition, some being unheated while others were given varying degrees of heat treatment, and in view of the fact that differing products might be subject to contamination from different sources, in order to be able to discuss which organisms should be limited, it was necessary to be thoroughly experienced in manufacturing methods and to be acquainted with the microbiological analyses of a large number of samples.

Limits of Plate Counts

With canned products, it was suggested that the count should be limited to the complete exclusion of all viable micro-organisms. Where cooked foods had to be subjected to further treatments, it was suggested that the viable count might be limited to, say, 2,000 per g. Luncheon sausage, liver sausage, and similar cooked sausage could not be subjected to a high temperature during cooking, and therefore a generous limit must be allowed. Well-prepared products should give a colony count less than 10,000 per g.

It was doubtful whether any limit could be fixed for uncooked meat products, *e.g.* fresh sausage, if animals could not be slaughtered on the manufacturer's premises.

Analytical Methods

In discussing the methods of analysis, the speaker outlined some of the problems that have to be considered in the design of analytical methods for counting the microflora present in the foods. It was obvious that further investigation and more discussion were required before they could be satisfactorily solved. Microbiological analyses of meat products (and other foods) call for something more than the inoculation of a suspension into nutrient agar and incubating at 37°C.

Contamination by Operatives

The speaker then described the various operations in the manufacture of meat products in which he showed how microbial contamination arose and multiplied. Recognition of the potential danger from the contamination of foods by the hands of workpeople had led to the consideration of control of the carrier, but even if this were practical, it could eliminate only one source of infection. The ideal must therefore be to prevent food being touched by anyone, an aim which might be achieved by the modification of operations which required manipulation of the food and by educating workers and management as to the need for these modifications. In the case of most meat products, it was a simple matter to design a process which eliminated touching the food with the hands.

The major problem, however, was to impress on managers and workers the necessity for adopting clean methods. If producers were told that unclean and careless methods could lead to food poisoning, they should be expected to react with alarm and immediately seek to improve their methods. But this was not always the result, many producers being unconvinced of the truth of the statement or that it applied to them.

Education on these lines was not all that was required. It was essential to design processes that were, as far as possible, above criticism from a microbiological standpoint, and the worker must be provided with mechanical facilities for carrying out processes without touching the product with his hands.

Milk and Dairy Products

In setting bacteriological standards for milk and dairy products, two separate problems were involved. One was the problem of safety, or the freedom of milk from bacteria which were pathogenic or potentially pathogenic to man; the other was concerned with saprophytic bacterial flora which caused milk to sour or which might lead to defects in manufactured milk products.

Dealing first with standards of safety, Arthur Rowlands, B.Sc. (Wales), M.S.(Cornell), said that heat treatment of milk provided by far the most effective means of ensuring the safety of our milk supplies. The chances of error in commercial treatment of milk had virtually been eliminated by improvements in the design of heat treatment plant and in the accuracy of control instruments; and also the application of the phosphatase test.

The possibility of reinfection of the milk after heat treatment also had to be considered, although this risk was likely to be eliminated from October 1, 1954, when pasteurised milk must be put into the containers in which it will be delivered to the consumer at the premises in which it is pasteurised and as soon as possible after pasteurisation.

Bacteriological standards were also desirable to ensure that milk would keep sweet until it was consumed. For this purpose a keeping quality of 24 hours after delivery to the consumer might be considered a satisfactory minimum standard.

Milk Tests

At present, different modifications of the methylene blue test were in use officially for raw and pasteurised milk. In general, compliance with the imposed standards ensured a satisfactory keeping quality, but there was much to be said for a common test and standard for all milk sampled during distribution to the consumer. Direct measurement of keeping quality, using clot-on-boiling to determine the end-point, deserved serious consideration as a method for routine control purposes.

For milk to be used for processing or manufacture, a rapid test to be applied to all milk as received was the first consideration. The 10 minute resazurin test, despite its limitations, was now in general use for this purpose. In addition, however, it was desirable to carry out tests on samples from all producers at intervals, in order to maintain their interest in milk quality and to encourage improvement where necessary.

A satisfactory raw milk was just as important for the manufacture of dairy products as for liquid distribution. In some instances it might be more so, for the raw milk might be a source of micro-organisms that might lead to serious difficulties in manufacture or to the development of faults in dairy products.

There were no official bacteriological standards for dairy products, and the speaker doubted whether there was, in fact, any call for such standards, although manufacturers must, in their own interest, maintain strict bacteriological control over the quality of the raw milk and manufacturing processes. Failure to do so might lead to faults in the products which would seriously impair their marketable value or make them entirely unsuitable for human consumption.

Eggs and Egg Products

The trend in the consumption of eggs and egg products seemed to be towards materials which presented greater bacteriological problems than those which they replaced, and the release of a product like dried egg for nation-wide domestic consumption raised questions which hardly existed when the material was used only for baking. However desirable it might seem to have bacteriological standards for eggs and egg products, it was not easy to decide precisely what these standards should be, especially in the case of shell eggs.

In their paper M. Ingram,

M.A., Ph.D., and J. Brooks, B.Sc., Ph.D., considered the bacteria found in naturally clean, dirty, and washed hens' eggs, both fresh and stored. Of the 7,000 million shell eggs used in Britain every year, roughly 95 per cent. are eaten "fresh" and, broadly speaking, if they presented a bacteriological problem it was not because they were particularly perishable during their short life, but because they might occasionally contain pathogens.

Eggs in Storage

Experience had shown that the wastage caused by microbial attack when shell eggs were placed in cold store was negligible when naturally clean eggs were stored under suitable conditions. Eggs with dirty shells, however, had inferior keeping qualities, and the extent of microbial spoilage during storage of dirty or washed eggs varied greatly between different countries and between different times and places in the same country.

However, the temperatures at which eggs were cold stored and the inhibitory mechanisms of the egg itself tended to restrict bacterial multiplication in stored eggs to bacteria which were non-pathogenic; moreover, if they had multiplied to any serious degree, the resulting qualities of the egg were likely to ensure that it was not eaten. There was also an additional safeguard, in that most shell eggs, whether fresh or stored, were usually cooked in one way or another. Above all, if commercial conditions were made satisfactory, these troubles were confined to a very few eggs indeed, and in these circumstances it was the authors' opinion that bacteriological examination hardly seemed worth striving for.

With egg products, however, a very different situation arose, for they nearly always contained large numbers of bacteria. Consideration was given to the bacteriology of liquid whole egg, frozen whole egg, spray-dried whole egg, and dried egg albumen and the bacteriological tests hitherto proposed for these products were discussed.

Occurrence of Salmonella

The occurrence of salmonellas which might cause a health hazard was described, and the authors discussed a more satisfactory solution to this particular problem—that of the pasteurisation of liquid egg. Although effective pasteurisation had been achieved on a factory scale, it seemed certain that very strict control of temperatures and holding times would be essential, because the coagulability of liquid egg greatly narrowed the available pasteurising range compared with that for milk. One suggestion was that liquid egg could be pasteurised by heating at 65°C. for 20 minutes if 1 to 2 per cent. trisodium citrate were added as an anti-coagulant. Batch pasteurisation of liquid whole egg by a modification of this process was being commercially practised in one European country.

Although the presence of small numbers of salmonellas might present little or no hazard when the material was well cooked before consumption, the specification of a permissible number afforded no safeguard against occasional use in conditions where multiplication might occur and the material be only lightly cooked. It would seem that the only workable standard for salmonellas was that they should be completely absent from the final product. This work raised the hope that pasteurisation treatments might make such a standard feasible.

Strawberry Colour Loss

Loss of natural red anthocyanin pigment, formation of brown pigments resulting from the so-called browning reaction, and discoloration resulting from heavy metal contamination, were the three main causes of colour deterioration in strawberry preserves, according to G. MacKinney and C. O. Chichester in a paper delivered at the annual convention of the National Preservers Association in Chicago.

An important conclusion drawn from samples examined was that pigment content alone was no criterion of an acceptable colour. The brightness component of the samples was shown as a function of storage time.

There could be a heavy loss (50 per cent. or more in some cases) without marked deterioration in colour, but a decrease in brightness meant the development of browning and a loss in attractiveness.

Immature fruit had a poorer colour and less flavour than ripe or overripe fruit. It was clearly of critical importance to the final colour that the initial anthocyanin content should be high.

The fruit preserve browned in the dark. The effect of sunlight might be merely to increase the temperature, consequently the use of amber or green glass containers would not help in retaining colour.

Vacuum cooking had a slightly beneficial effect and the same was true of the use of liquid sugar.

It seemed to be widely held that slow cooking was preferable to rapid cooking for the obtainment of colour retention. If this were the case, presumably it was a mixing and heat transfer problem throughout the mass. Time/temperature relationships should be derivable which were exactly equivalent, consequently some such explanation must account for the observations with regard to all the above instances. The colour, however, was not stable on storage; differences, which might appear marked at the start, were usually very slight after two or three weeks at 100°F.

With regard to metal contamination, there appeared to be two alternatives—the use of either stainless steel or copper kettles.

While undue copper pick-up was not desirable, stainless steel might develop hot spots more readily than copper.

FUTURE ARTICLES

ARTICLES to be published in forthcoming issues of FOOD MANUFACTURE will include an illustrated description of a British biscuit factory and the third part of Dr. Aylward's article on lecithin.

Encyclopaedic Gastronomy

In the course of a preliminary flipping of the pages of a recently published encyclopaedia* on food, the impression might perhaps be gained that there must be a mighty lot of food in the world; whether this is true or not a second flip will convince the intelligent reader that at all events there are many foods available which are neglected. In his foreword, Mr. André L. Simon who, as most people know, has devoted much of his long life in the attempt to persuade the English-speaking world to eat and drink with greater enjoyment and discrimination, stresses this neglect and deplores many missed opportunities for more elegant feeding. As examples, he mentions "sorrel—a weed which can be grown anywhere, at all times, and at very little cost; excellent in soups and sauces and with tasteless white fish or with poached eggs. But it is too cheap and it does not pay to sell it, so one cannot buy it in the shops."

The sea, adds Mr. Simon, is full of different kinds of fish good to eat, but there are few of them to be found in the fishmongers' shops.

Nothing can be done about these things, seeing that most people have to obtain their food in such a way, but what a treasure this volume is for those whose souls (and stomachs) rise above the "roast (or boiled) with two veg."

The present reviewer, familiar with the dishes of a number of nations, tried to trip up the compiler by looking up such things as *puchero*—the national dish of Argentina—but there it was as large as life on page 479. It is indeed larger than life, for the *puchero* of the Argentine people is a far simpler thing. However, if the recipe is read with a little imagination, it will be found to contain the germ of a large number of different dishes; although none will be genuine without the necessary corn cobs.

There are *gnocchi* and *ravioli*—excellent and nutritious dishes—capable of being made from readily available materials, and . . . but it would be possible to go on *ad infinitum*. But, may ask the "good plain cook," why have to copy these "messy foreign dishes," not realising that they are of the essence of her soggy macaroni, transformed into something rich and rare.

On the day of this writing the reviewer was served a dish of broad beans, of which he is uncommonly fond. There they were, heaped at the side of the plate, *sans* sauce, *sans* garnish, with their tough skins left on. A glance at the book would have told the cook with what little extra trouble an attractive dish, even if served alone, could have been made with this succulent vegetable.

As might be expected, the wine section is extensive, running into 166 pages, and is a token of the thorough way in which the world has been screened for every conceivable type of liquor. For the bold experimenter there are some interesting mixtures, and in these days when at cocktail parties the choice is between sherry and martinis, the three and a half pages of cocktail recipes judiciously read might be helpful in breaking the monotony.

These observations are entirely inadequate to describe the excellence of this encyclopaedia. Mr. Simon has written a large number of books on food and cookery, and we are wondering whether he has left anything to say about the subject for a future one. Perhaps he has, and if so, we shall certainly read it; for he is one of those rare people whose enthusiasm and authoritativeness give pleasure to the most casual of readers.

* *A Concise Encyclopaedia of Gastronomy*. By André L. Simon. Pp. 827 + xii. Collins. Price 42s.

Electronic Smoking Process

Sides of salmon can be smoked in 17 seconds without affecting colour or flavour by the use of a new machine and electronic process, which is replacing the conventional smoke-house procedures for fish processing in the United States, and which is effecting substantial economies through increased productivity and saving in time.

Developed by the Los Angeles Smoking and Curing Co., the process has telescoped the heating, drying, and smoking of salmon into a cycle of a few hours, substantially reducing the eight to 12 hours' time required when these related operations were performed in the smoke-house. It is predicted that the process will also eventually be adapted to the smoke-curing of various kinds of meats.

The smoking machine, which is electrically operated, is of the cabinet type with metal trays on which the salmon sides are carried through the smoked area by a 6 ft. wide conveyor. Wood smoke is carried through a duct system incorporating a fan and distribution hood, and is injected into the machine through a special blower which controls the volume and rate of movement.

A heating element within the duct raises the temperature of the smoke in instances where it drops unduly during passage through the duct to the machine. Upon entering the machine, the smoke travels to a gridwork of tungsten wire ionisers which blanket the roof of one section of the cabinet. Carrying a 16,000 volt charge, the smoke stream is directed by use of a precipitator.

Operational control is simple and flexible, and the basic circuit consists of relatively few components and no moving parts, permitting easy adjustment. In operation, the product is carried under the charged smoke which penetrates almost instantaneously. Disappearing into the product tissue, very little is left to be passed off through the exhaust opening. Prior to placing in the smoke cabinet, the pickle-cured salmon fillets are hung for several hours in an air-conditioned chamber where they are warmed to between 60° and 90°F., to remove moisture and leave the surface dry and firm.

The Chemistry and Physics of Macaroni Products

PART I

J. A. Radley, M.Sc., F.R.I.C.

The manufacture of macaroni products consists of mixing semolina and water to form a paste, which is extruded through a die under pressure, and drying the product. Considering the apparent simplicity of the process it would appear an extremely easy matter for anyone to embark upon the production of such goods. That this simplicity is deceptive is readily understood if the quality of a number of macaroni products on the market a few years ago is recalled, but to-day the standard of quality of the best British macaroni products is second to none in the world; it would be even better if the manufacturers were allowed free access to the raw materials they want.

NOT all products disappeared from the market because their sales were influenced by their low quality. Some quite good ones suffered in the general reversion of public taste against paste products when controls were lifted, but this movement was, in part, owing to the large amount of second class material which had found its way on to the market during the previous eight years.

Such goods as long macaroni, spaghetti, and vermicelli present the greatest difficulties in the maintenance of a high standard, since several physical factors enter into their manufacture which are absent when making "short-cuts" or small pieces.

What Comprises a Good Product ?

Macaroni is judged in the trade by several physical and physico-chemical properties which may vary quite considerably in some instances without detriment to the quality assessment, but which in others may relegate the material to a lower grade.

For example, a good macaroni should possess a clear, golden-yellow, or amber colour, but this may pale almost to white without detriment to its quality assessment. It must not, however, show any tinges of red, grey, or brown, and it must be uniform in colour throughout, otherwise the product will be downgraded for quality assessment.

Great stress is laid on colour in the U.S.A., and an immense amount of research has been carried out on its definition and measurement and on the production of hybrid wheats to give suitable semolinas yielding good coloured macaroni. It is not necessarily more important than such attributes as nutritional value, cooking properties, protein content, flavour, or breaking strength of the macaroni, but it is more easily recognised by the buyer, so that colour weighs heavily in macaroni sales appeal.

Durum wheat, which is a hard, "flinty," or "glassy" type, is the best for macaroni manufacture, giving the desirable golden-yellow colour when correctly processed and also imparting other properties not readily attainable or unobtainable by the use of the softer wheat varieties.

Measurement of Colour

The colour of wheat and semolina has been measured by (*a*) the chemical determination of the carotenoid, or yellow, pigments in the wheat or semolina, or (*b*) physically, by instruments that measure colour. The colour dissolves in gasolene, and it was this test that originally revealed that the Mindum variety was well suited for macaroni.[1]

The surface of macaroni may be smooth or rough to the touch, and an uneven, serrated, or "crinkled" surface is considered a sign of poor quality. Again, macaroni may have either a smooth or rough surface to be acceptable; uneven, serrated, or crinkled surface will lead to the unanimous rejection of the product by professional buyers.

As the tensile strength of long goods is indicative of quality, a product possessing "whippiness," *i.e.* good tensile strength, good elasticity, and flexibility, is greatly preferred. A good spaghetti should, in a three to four foot length, be capable of bending into a circle. Tensile strength is capable of being measured with a high degree of reproducibility and gives most interesting information on the materials used and methods of manufacture, especially when considered in conjunction with other physical tests. In short goods high tensile strength is not so important as their resistance to "shattering."

It is generally considered desirable to have a product that is substantially free from specks, their size and number depending largely on the fineness to which the semolina is ground and on the degree of extraction.

With present-day supplies of durum wheat at the permitted extraction rate, the author has found that in good samples from 20 to 40 specks per square inch of surface are visible to the naked eye. In some good macaronis, the finer milling of the original semolina at the same extraction rate will break each larger bran speck into several smaller ones.

The fracture of a good macaroni is smooth and glasslike, and should not be "mealy" or show granulation. It should cook to a firm yet tender product.

The cooking test, devised by the author, gives significant information on the method of manufacture as well as numerical measurements of such cooking qualities as cooking time, tendency to disintegrate, cooked weight, and disintegration rate. It also indicates that the "quick-cooking" macaronies owe this property, not to any special processing, but to their physical state.

Origin of Macaroni

The origin of the manufacture of macaroni products is obscure, but Harris and Knowles[2] think it may have started in China or Japan, although this is difficult to understand in view of the practical non-existence of durum varieties of wheat in the latter country. The Italians learnt the art of macaroni making from the Asiatics, and were producing it in the fourteenth century. They afterwards predominated in production and consumption of these products. It reached France before Louis XIII's reign, and was made by hand, the first semolina mills being erected in the middle of the nineteenth century in France and later in North Africa. The first mechanical process for manufacturing macaroni was perfected about 1800.

Manufacture in the U.S.A. started in about 1860, but large scale production was not attained until 1870. It was 1900 before the industry assumed any real commercial importance in that country, where it is now a large and thriving industry.

Wheat for Semolina Manufacture

From viscometric studies of wheat starches, Rask and Alsberg[3] concluded that durum and hard winter wheats were more suitable than hard red spring wheat for macaroni products. The endosperm of the vitreous durum wheat kernel and the individual starch grains are translucent.[4]

The amber durum is most suitable,[1] since it gives good strength with a desirable creamy yellow colour. The red variety of durum gives a dull-grey macaroni. Mindum and Kubanka varieties are satisfactory varieties for milling purposes, but lack resistance to certain plant diseases.

In 1943 the Carleton and Stewart varieties were introduced in America, and these are more resistant to "stem rust" and are claimed[5] to be equal, if not superior, to Mindum in macaroni making qualities. The latter gives a first class, bright amber, translucent product when properly processed.

The most desirable durum wheat for semolina making should not contain more than 16 per cent. protein.[1] Protein content may run as high as 20 per cent., but in such cases the millers experience difficulty in using the wheat because the product therefrom would be protein-bound or "tough."

Protein Content

Protein quality is not considered by some workers[6] to be so important in the manufacture of alimentary products as it is in breadmaking. Some work undertaken by the author yielded results indicating that it may have quite an important influence on the cooking properties of the product, and that other properties were also influenced by the quality of the gluten.

A protein content above 12 per cent. is satisfactory, and the U.S. food authorities allow the addition of gluten to macaroni mixes to give a total up to 16 per cent., but too high a protein content may be detrimental to macaroni quality. Besides being harder and more flinty than bread wheats, durum wheat is often higher in protein and pigment.

The results of Harris and Knowles[6, 7] for a wide variety of samples of durum wheat from every state west of Mississippi were as follows:

Ash	1·3 to 2·3
Fat	1·1 to 2·4
Sucrose	1·6 to 3·9
Fibre	1·7 to 2·85
Moisture	8·0 to 12·0
Pentosans	5·8 to 8·2
Protein	10·1 to 17·7

Weight per 1,000 kernels = 23·2 to 55·1 g.

Alsberg,[4] in discussing the utilisation of durum wheats, points out that the tendency towards higher protein content in durum wheat macaroni products may be of considerable significance in the cost of national dietaries since, in most countries, protein is an expensive ingredient of the diet. Partly owing to its high pigment content, however, durum wheat is not regarded favourably for breadmaking. Alsberg thinks it likely that durum products are slightly better in food value than bread wheat products, owing to the higher pigment and protein values. In this connexion, the starch of durum wheat is considered more susceptible to amylase attack and more easily digested than starch from breadmaking wheats. Protein content and macaroni tenderness do not appear to be related.

Other Raw Materials Used

In Canada the Carleton variety of durum wheat is said to be used almost exclusively in the manufacture of macaroni products, but throughout the world, wide variations in the raw materials used are encountered. Durum wheat in admixture with a suitable proportion of Manitoba wheat is favoured by some manufacturers, such mixtures giving satisfactory products. Excluding the U.S.A. and European countries, such materials as rice, maize and potato flours, wheat bread flour, rye, barley, oats, soybean meal, and the ground particles of other farinaceous substances have been, or are, employed, but the quality of such products often leaves much to be desired.

Although some products examined by the author were very good and stood up well to the various criteria of good cooking quality, the colour ranking was low. Quality studies on durum wheats in U.S.A. have been investigated by a number of workers.[7]

P. Nottin and J. Lacrois[8] find that it is possible to make macaroni products free from specks from certain highly vitreous soft wheats. Flours from such wheats, however, give dark coloured products.

Products made from semolina invariably contain bran particles which allow them to be distinguished from those made from flours. Hood[1] considers that macaroni products tend to break at a point where a bran particle occurs, and advances this as an important argument for having semolina as bran free as possible.

The author has been able to demonstrate, however, that this influence has been much overstressed, and that air bubbles in particular, minute shrinkage cracks, and existing strains owing to uneven shrinkage in drying are more important than bran particles.

Damaged Wheat and Macaroni Quality

A brief *résumé* of the agronomic, milling, and macaroni making characteristics of the standard wheat varieties has been published.[9]

Inferiority in grade or damage to wheat may arise from (*a*) harvesting before the wheat is mature, (*b*) disease, or attacks by fungi, etc., (*c*) wetting the grain during harvesting, causing sprouting before threshing or milling.

With increasing maturity there is an increase in the content of vitreous kernels in durum wheat, and in the protein content, but moisture absorption consistently decreases with maturity. Samples of Mindum harvested at four different dates not only showed decreasing absorption but also an increased protein content, test weight, grade, and macaroni colour, with age of the kernel before cutting. It would appear that the effect of maturity at the time of cutting on the composition and physical properties of the grain is more critical in the case of durum wheats than with bread wheats.

W. E. Brentzel[10] found two types of damage in the 1940 N. Dakota wheat crop, and classified them as "black point" and "other damage." Black point was found to be caused by two types of fungi: *Alternaria Fusarium* attacked the kernels which were plumper and heavier than normal seed, and a smaller proportion of the total infection which resulted from the attack by *Helminthosporium Sativum* on shrivelled seed.

Harris and Sibbett[11, 12] have followed the effect of "black point" infection on the quality of macaroni made from semolina milled from such damaged grain. These infections are particularly prevalent in wet, cloudy harvest seasons, attacking the grain and lowering the quality.

Ten per cent. of lightly damaged grains (with discoloured top only) does not affect the macaroni making quality, while even 25 per cent. does not greatly lower the colour value or increase the speckiness. Over 50 per cent. by weight is dangerous in use, while 75 per cent. of lightly damaged grains gives an inferior article.

Heavily damaged grains are very much more marked in their effect, the presence of 5 per cent. of such grains causing speckiness and giving inferior colour, while 10 per cent. is very detrimental. If lightly and heavily damaged kernels are both present greater attention must be paid to the allowable percentage of heavily damaged grains.

The effect of wheat blights is to reduce the cooked weight and tenderness score of macaroni made from the affected wheat; with severe damage the reduction in these values is marked, and the degree of disintegration on cooking increases. This is no doubt due to the degradation of starch and protein to more soluble forms of carbohydrate and protein-cleavage products respectively.

A substantial amount of work has been done on the effect of sprout damage on bread wheat quality, but only a little on durum wheat.[11, 12, 13] Harris and Sibbett allowed aliquots of a sample of sound hard amber durum wheat to sprout under uniform conditions for varying lengths of time, in order to obtain three distinct stages of sprouting; these were defined by the length of the sprout obtained.

After milling, the resulting semolinas were processed into macaroni by standardised methods. Various proportions, by weight, of each of these stages were also mixed with sound wheat and the mixtures processed to macaroni. Various chemical determinations were made on the samples, as well as a visual colour score determination of the macaroni.

While sprouting did not affect the ease of milling the blends, there was a marked effect on the properties of the dough during the macaroni processing. Doughs made from blends containing a high percentage of badly sprouted wheat were "crumbly" and "short," but after the customary amount of kneading appeared to have normal consistency. Semolina yield was significantly reduced when over 20 per cent. of sprouted wheat was included in the blend. Little influence upon semolina ash was noted, except that high percentage of sprouted wheat showed a slight trend toward a decrease in ash.

The diastatic activity was greatly influenced, both by the percentage of sprouted wheat in the blend, and by the degree of sproutings, while absorption was generally lowered by the same factors. The effect of sprouting was most marked upon diastatic activity and macaroni colour, and in the present instance these two factors bore a high negative relationship to each other, *i.e.* macaroni colour was markedly decreased by increased sprouting.

Harris and co-workers[11] think that the determination of diastatic activity may be a convenient method for predicting the probable macaroni colour of a sample suspected of containing sprout damage, provided no complicating factors, such as blight or other damage, are involved. The presence of 10 per cent. of grains sprouted to the second or third stages in admixture with sound grains had more effect on both diastatic activity and colour than when all the grain had sprouted to stage one.

Five per cent. of heavy damage reduced the colour score some 40 per cent. The second stage of sprouting decreased the score less severely. In the first stage of sprouting 20 per cent. of sprouted grains had a noticeable effect. Blends containing the severely sprouted kernels gave macaroni that had a brownish colour.

Soaking and chilling the wheat kernels, without allowing them to sprout, significantly reduced the test weight and grade, but was without effect on the colour of the macaroni made from it. Thus, germination is an important factor in the quality of the raw material, and the length of sprout has a greater influence on quality than the percentage of sprouted kernels present.

Development of Brown Colour

With reference to the development of the brown colour in macaroni made with severely sprouted kernels, some work in the author's laboratory tends to indicate that the sugar formed can react with proteins or protein degradation

products to produce brown coloured materials. It is possible that this development of a brownish colour in macaroni which contains sprouted material or which has been left too long with too high a moisture content before drying is another aspect of the "browning reaction." Working on this assumption, the author has added materials known to retard or inhibit this reaction before processing, which, despite subsequent deliberately bad processing, designed to produce an off coloured product, gave material of good colour quality.

When macaroni is stored under slightly damp conditions its colour will turn, in a few months, from the clear amber to a brownish yellow or brown. Additions of agents inhibiting the "browning reaction," however, gave products which stored excellently under very poor conditions of storage.

Function of Amylases

The increase in diastatic activity, brought about by the addition of semolina from sprouted grain to the mix, adversely affects both colour and absorption.

Wheat contains two enzymes, both of which can attack starch. That which causes it to liquefy and break down into dextrins is called α-amylase, while that which causes starch to break down into sugars and dextrins is called β-amylase. The amounts of these substances present in wheat are found to depend on both variety and environment and stage of growth.[15, 16] Wide variations in the water soluble β-amylase content of a number of Australian bread flours have been noted,[17] while an extensive study[18] of flours from Canadian hard red spring wheats, has shown that the varietal means for total β-amylase activity varies from 42·1 to 26·8 units.

Undamaged starch granules are not attacked by β-amylase,[19, 20] although wheat flour does appear to contain an amylase which can affect undamaged starch granules. Mechanically damaged, and partially or wholly-gelatinised granules, however, are readily attacked. Furthermore, "native" (*i.e.* undamaged, raw) starches from different plants show varying degrees of resistance to attack by amylases and durum and vulgare wheat starches differ in this respect.

Different degrees of susceptibility to attack by β-amylase are also shown by the gelatinised starches from different plants, and are found with durum and vulgare wheat starches.[21] It may be that the susceptibility of durum wheat starches to diastatic attack has earned semolina and macaroni products the reputation of being easily digested by invalids and young children.

In commercially milled wheat flours the amount of starch granules damaged mechanically, during milling, varies with the hardness of the grain, and in soft wheat 1 to 2 per cent. of the starch granules are so damaged, in hard wheat flour some 3 to 4 per cent., while in durum flours from 6 to 8 per cent. are damaged.

In wheat flours there is ample enzyme by comparison with the small amount of susceptible starch present so that the activity of the system is not limited by the amount of amylase present but by the amount of damaged starch. By making a dough or a suspension of wheat flour in water and measuring the amount of sugar formed on standing (the "maltose value") some estimation of the susceptibility of the starch and the amount of enzyme present can be obtained.

Many workers have shown the dependence of maltose figures on both the substrate (starch) and the amylases; others have shown that the variety of wheat and its environment of growth are important factors and that a correlation exists between mechanical injury in milling and maltose production in the doughs or water suspension. It may be significant that durum wheat often contains a high percentage of sugar and can be used in small proportions with a bread-making wheat to remedy a lack of sugar in the latter for bread-making purposes.

All these points may have important consequences in macaroni production. Durum wheat is hard, sustains more damage in milling and is, therefore, more prone to amylase attack after the semolina has been mixed with water than would be the case with hard wheats or soft wheats. Conversion of the starch would proceed during any mixing period, resting period, and during the drying period, the latter being a comparatively long one at temperatures which would normally greatly speed up the conversion of starch to sugar and dextrins.

It seems rather significant that brown coloured macaroni is readily produced if the drying is unduly delayed or prolonged in view of what has been said about the browning reaction, which involves the presence of sugars. During the extrusion process, more starch granules may be damaged and become available for amylase attack, although the author has been unable to find any conclusive evidence of this.

It is not known whether maltose and dextrins are produced in appreciable quantities in processing and, if formed, whether their presence would exert a good or a bad influence on the quality of the product. Some dextrins appear to plasticise, or make flexible, films of starch containing them, and glucose can also act as a plasticiser for starch films, and it may be that the suitability of durum wheat for macaroni making is partly owing to the greater formation of dextrins or sugar during processing than with other wheats.

The Liquefying Amylase

With regard to the role of the liquefying amylase (α) only small quantities of this are present in ungerminated wheat, but a great deal in germinated wheat. This may explain the unsatisfactory behaviour of germinated wheat or wheat containing germinated grains. Before germinating, wheat contains about 0·043 units of α-amylase. Kneen, Miller, and Sandstedt[22] found after three, four, or five days' germination 40·5, 90·7, and 238 units respectively to be present.

Alpha amylase can attack undamaged granules and cause them to liquefy,, thus a firm "dough" of starch and water apparently becomes more fluid.

This amylase is also more resistant to high temperatures than β-amylase, so that although the speed of action of both, up to a certain limit, increases with temperature, the β-amylase begins to be "killed off" at temperatures where α-amylase is operating at an enhanced degree.

Since α-amylase can attack undamaged, damaged, or gelatinised starch granules, it may be that it exerts an influence in the drying process. As is generally known in the trade after extrusion the product is "fanned" for a short time with hot, dry air to strengthen it and make it easier to handle. When allowed to rest in a humid atmosphere for a short time it "sweats." This is generally regarded as being due to the moisture in the product redistributing itself evenly throughout the mass.

It may be that there is, concurrently, an attack by the α-amylase on the partially gelatinised starch present converting this to dextrins which have a very much lower water holding power than gelatinised, undegraded starch. Such an action would liberate "free" water previously held by the partially gelatinised portion of the starch so that the paste would then become more fluid since more water would be available than is required to make a stiff dough, *i.e.* the absorption capacity of the semolina falls.

Such action would also tend to influence the amount of soluble material lost by the product on cooking in water. During the rest of the drying period, this action would be continued at a slower rate as the moisture was removed.

Removal of starch by amylases may well alter considerably the final characteristics of the macaroni product by decreasing its water holding capacity when cooked with water; at the same time dextrins and sugars may be formed which "plasticise" the product in the uncooked state.

The mechanism proposed is quite feasible and should be capable of being confirmed experimentally. If the work was carried out using spaghetti, then the findings could be correlated, not only with cooking tests but with measurements of tensile strength and resistance to shattering.

(*To be continued*)

Crumb Colour

WHETHER he is free to use prewar patent flours, or has to do his best with 80, 85, or even 90 per cent. extraction flours, the present-day baker aims, as he has always done, to produce bread with as white and clean a crumb colour as possible.

The ways of achieving this and the factors which affect crumb colour are the subject of a recent article by W. P. Ford, M.A., F.R.I.C. (*The Arkady Review*, **29**, 1, 11).

In selecting the flour to be used, the baker should remember that its colour and strength have an important bearing on the colour of the crumb. Flour colour is made up of two features: the grade colour, which means freedom from as much bran powder as possible, and the yellow colour from the wheat oil which is bleached to a greater or less extent by the miller. Of these, the grade colour is the more important to watch because a slightly creamy colour is no disadvantage as long as it is bright and clean, whereas a dirty colour is difficult to eradicate. For English bread the flour should be of medium strength.

In the fermentation process, everything depends upon getting the gluten of the dough into the best condition to stretch at moulding and when the bread is set in the oven. This can be assisted by carrying out some part of the fermentation without salt, as in a sponge and dough, or the delayed salt method, both of which generally produce bread with a better crumb colour than when the fermentation is a straight dough.

So many of the features of a good loaf depend upon the gluten having been well stretched, not once, or twice, but a number of times. A good mixing brings up crumb colour, but it should be followed up by stretching again at knocking back, handing up, and moulding.

The laying up of the direction of the crumb structure in relation to the way the loaf is to be cut also has an important bearing on crumb colour. Obviously, if the crumb can be made into a better reflecting surface for light, it will appear brighter and whiter; this is achieved by laying up the crumb so that the holes are shallow and do not show the dark shadows which appear in deep holes. Eight-piece, four-piece, and twist bread are all attempts to improve crumb colour and texture in this way.

There is no doubt that some ingredients, other than flour, do have a big influence on crumb colour, but there is no ingredient which can be added to dough which will take the place of proper attention to the other factors which go to make a good loaf. The use of too much water is also to be deprecated. Even half a gallon per sack can very easily spoil the colour of bread, and this has been especially noticeable with bread made from 85 per cent. and 80 per cent. flours.

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Food Science for the Layman

So far as this reviewer knows Dr. Pyke's recent book* is the first comprehensive one about food processing and food manufacture to be aimed at the ordinary, non-technical reader. Although its title is apt enough for the well-informed, it runs some risk of misinterpretation; there is no major distinction between townsman's and countryman's food in a modern civilised community, and all the food that makes up a national diet is "townsman's food" in the metaphoric sense of the title. To feed the crowded populations of such communities there must be complex food industries.

The primary purpose of this book is to explain why so much processing of food is necessary; only secondarily is it Dr. Pyke's purpose to describe in broad and brief detail the main kinds of processing that are adopted. To those faddists and creedmongers who believe that our diet should be more simply and directly linked with soil or sea the book is a firm and patient answer. None of them will take the slightest heed of it, for their views are based upon passion and prejudice and only psychoanalysis or hypnosis could produce conversion; but as most people are open-minded, Dr. Pyke's laudable effort to explain "why" and "how" should do much to counterblast the propaganda of those who preach the anti-processing gospel.

He avoids rhetorical frills or exaggerated presentations of the "miracle-of-science" type; indeed, he does not hesitate to expose the limitations of science, as in his excellent chapter on fish; what might easily have become a dull, factual narrative is well seasoned with puckish humour.

Although the author succeeds so well in his main purpose, he has sometimes gone slightly astray in describing the details of certain items of food processing, for instance, corned beef. However, any criticisms on this score must be tempered with appreciation of the size of the task. Bread, meat, chicken, fish, eggs, milk, cheese, ice cream, fats, sugar and sweeteners, vegetables, fruit, and jam—no one could possibly cover so wide a field and achieve on every page the perfect blend of simplicity, word economy, and impeccable accuracy.

With justice Dr. Pyke says in his preface that only a committee of experts could today write with full authority about so many different foods and processing problems. It is doubtful whether the non-technical layman will, in fact, understand sufficiently all that is involved in a process; Dr. Pyke has handicapped himself in the pursuit of layman understanding by covering so much in under 200 pages of text.

A strange gap in his presentation of food technology is the absence of connecting facts to explain his relatively kindly attitude to dulcin on page 152 and his classification of that substance as a failure of modern food science on page 200; as only the former reference is indexed, the reader might easily be misled.

This most readable and purposeful book is one that should be widely supported by the food industry. It deserves the praise it has already been accorded in a number of non-technical papers and journals.—D. P. H.

* *Townsman's Food*. By Magnus Pyke, B.Sc., Ph.D., F.R.I.C. Pp. 212+viii. Turnstile Press. Price 15s. net.

Commonwealth Agriculture

A REPORT* on Commonwealth agriculture issued by the Commonwealth Economic Committee surveys the background to the current problems of what is described as "the largest industry of the Commonwealth." Examining in turn the changing pattern of agriculture for individual Commonwealth countries, the report includes a general review of the trends of production and prices as well as a summary of the way in which Commonwealth trade in agricultural products has developed. It assembles evidence to show that notwithstanding many structural changes for the Commonwealth as a whole, agricultural production has increased since before the war while the volume of Commonwealth agricultural exports has in general risen above the pre-war figure.

The report itself bears witness not only to the extent but also to the diversity of Commonwealth agriculture, which comprises almost every variation in soil and climate, land tenure and management, and methods of cultivation and marketing; it points out also that agriculture in the Commonwealth, as elsewhere, is not a static industry and that the emphasis shifts as new problems and needs arise. While, therefore, it is not possible to survey in detail the whole field, recent trends in output and external trade can be related to the changing pattern of agriculture in the countries concerned; moreover, the report enables the pace of progress to be checked and development plans to be assessed in the light of current trends.

* *A Review of Commonwealth Agriculture: Production and Trade*. Pp. 201+vi. Published for the Commonwealth Economic Committee by H.M.S.O. Price 7s. 6d. net.

New Books Register

Orders for any of the books listed below, or scientific and technical books in any language, may be placed with the Books Department, FOOD MANUFACTURE, *17, Stratford Place, London, W.1. A selected stock of books is carried and may be inspected at the above address. Prices given do not include postage.*

Thornton, H. *The Inspection of Food*. Baillière. Pp. 223. 58 illustrations. 12s. 6d.

Profitability of Sugar Beet Production in Lindsey in 1951. Nottingham University School of Agriculture, Loughborough. 1s.

Martin, G., and Cooke, E. I. *Industrial and Manufacturing Chemistry*. Part I—*Organic*. Technical Press. Pp. 894. 240 illustrations. 84s.

News from the Industry

FORTHCOMING EVENTS

Borough Polytechnic

Beginning September 29, 1952, a course in biscuit making has been arranged at the Borough Polytechnic, London. It will be given one evening a week for 26 weeks and on each evening there will be a demonstration and/or practical work, and a lecture on the raw materials of the industry.

The course should be useful to biscuit making operatives, trainees, and other personnel, and to the flour confectioner who wishes to extend his knowledge in the biscuit making field.

Safety Campaign

A campaign, to be known as Better Housekeeping Week, is being organised by The Royal Society for the Prevention of Accidents, to take place from October 6 to 11, 1952. Last year a similar campaign took place with the object of making workshops and factories tidier and safer places of work. In consequence of the success last year, the event is being repeated.

Ice Cream Hygiene

Another step forward in the important subject of food hygiene has been pioneered by J. Lyons and Co. Spoons for sale with ice cream tubs in cinemas and other places are being supplied in individual paper bags at no extra cost to the consumer.

An official of the company said that, at present, the production of these paper bags is not sufficient to take care of all outlets, but it is hoped to increase production capacity in the near future.

Baking Oven for Aircraft Carrier

All electric baking equipment, long favoured in Her Majesty's ships, has many advantages such as the extreme compactness and the avoidance of the necessity of a flue outlet. The latest of H.M. ships to be so equipped is the aircraft-carrier H.M.S. *Eagle*. In designing the bakery for this ship The General Electric Co. were faced with the problem of providing ovens that, within a very limited deck area, would be capable of a very large output of bread per day.

To meet these requirements a standard 8 ft. × 4 ft. double-deck peel type baking oven was so redesigned that it could be loaded in one-third of the normal time, thus increasing the effective baking period and daily output.

A standard 8 ft. × 4 ft. G.E.C. electric double-deck peel type baking oven redesigned for loading in one-third the normal time has been installed in H.M.S. "Eagle."

A slatted sole, similar to that in a conveyor oven, but built entirely within the baking chamber and worked by a geared hand wheel at the side of the oven, has been used in place of the static steel-lined sole usually provided in marine baking ovens. The standard elements used in the crown and beneath the slatted sole are arranged to run from side to side. Heat regulation is provided by the usual switch control. To load the oven, rows of bread tins are placed on the movable oven sole by an operator, while his assistant winds in the sole, each oven being provided with a full width counterbalanced door. Subsequent rows of bread tins are loaded in the same way. This method makes for a considerable saving in space as no provision is necessary for working a 9 ft. 6 in. peel in front of the oven.

Ultrasonics and Emulsification

A new machine, which is the outcome of several years' research in producing ultrasonic waves effectively by mechanical means, claims to provide the solution to the problems encountered in the process of emulsification.

It has applications in the manufacture of chemicals, essences, ice cream, confectionery and many other food products.

Known as the Rapisonic (patents pending) this new unit, made by Ultrasonics Ltd., is based on the principle of the Pohlmann Whistle. The vibrations are brought about by a jet of liquid impinging on a blade which vibrates at its natural frequency. Both jet form and blade are enclosed by a resonant bell, which concentrates the local ultrasonic effect.

Emulsification takes place when cavities are swept out by the blade which is oscillating at about 30 kc.—a frequency beyond the range of audition. On the collapse of these cavities instantaneous local pressures of the order of 30,000 lb. per sq. inch are built up. Although there is still some doubt as to what actually causes the dispersion, it is certain that the cavitation plays the main part and that other effects are secondary.

So fine are the emulsions obtained with this machine that in most cases the amount of emulsificant can be reduced, and in some left out altogether. This feature is particularly attractive where conventionally made emulsions contain an agent undesirable in the finished product.

The machine has an output of 420 gallons per hour and can be clamped on the side of existing mixing vessels. All parts in contact with the liquids are of stainless steel and other parts are made in light weight alloys wherever possible, to keep the power/weight ratio down to a minimum.

The frequency at which the blade vibrates can be easily adjusted, and the machine as a whole has been designed for utmost convenience of use and maintenance. The internal parts of the ultrasonic head can be dismantled by hand, and cleaning presents no difficulties.

OBITUARY

Colonel Wallace Charles Devereux, C.B.E., on June 21, 1952, at the age of 60 years. Col. Devereux was a prominent industrialist and was probably the outstanding figure in the light metal industry. He was managing director, Almin Ltd.; chairman, International Alloys Ltd., Southern Forge Ltd., Warwick Production Co., Ltd., Structural and Mechanical Development Engineers Ltd., Fulmer Research Institute; and director of Renfrew Foundries Ltd., and other companies.

*

Mr. Samuel Holt, a director of William Brierley, Collier and Hartley, on June 12, aged 71.

Mr. Holt was the youngest son of the late Mr. Thomas Holt, J.P., of Castleton, Rochdale, and joined Luke Collier and Son, Ltd., in management with his brother, Mr. J. C. Holt, when Mr. William Brierley purchased that business, in conjunction with Mr. Thomas Holt, J.P., in 1913. The concern was amalgamated in the well-known Rochdale firm of William Brierley, Collier and Hartley, confectionery and preserving machinery manufacturers, in 1924. Mr. Samuel Holt then joined the Board of the new organisation. He retired from management several years ago, but continued an active and popular member of the directorate up to his recent illness.

Mr. Holt will be remembered as a keen and lively member of the industry which he served for the greater part of his life.

Fruit Preserving Plant

A wide range of machinery for use in the fruit preserving industry was displayed at the British Food Fair by Caleb Duckworth.

In addition to the jam filler designed for filling 1 lb., 2 lb., or 7 lb. jars or tins, the company now produce an entirely automatic rotary filler which has been made to handle 1 lb. jars only.

This unit takes the jars from the conveyor line, fills them, and returns them to the line for conveyance to the vacuum sealing machine. A specially designed cap of heavily lacquered steel is placed on the jars before they enter the sealing head. The vacuum sealer is entirely automatic, its speed of 30 jars per minute being synchronised with the filler. On entering the sealer, each jar receives a considerable force of superheated steam which impinges on the centre of the cap for seven seconds, after which the steam supply ceases and cold water floods the top of the cap; this produces an immediate vacuum.

The jars then enter a finisher, capable of operating at up to 3,000 jars per minute, which has two rotary heads. In the first of these they are rotated against wet revolving nylon brushes and sprayed from above to keep them clean and free from stickiness. The transfer wheel takes the jars from the first head to the polishing head where further nylon brushes rotate against the jars. The polished jars are then returned to the conveyor line.

A new machine exhibited by the company was a mincemeat filler which has the advantage of drawing the mincemeat from floor level, thus eliminating the need to lift the product to a height. The mincemeat is drawn by piston into a stainless steel measuring cylinder, the capacity of which is easily controlled by the operator, and is then pumped through a 2 in. stainless steel tube to the filling head with an Alkathene nozzle.

This machine is designed to operate at the rate of 15 jars a minute and the mincemeat is filled free from air pockets.

Other exhibits included two factory can openers and a dried fruit cleaner.

Grape Sugar

Supplies of grape sugar are now available to the trade. This product is vacuum concentrated and has a sugar content of 80 per cent. As a result of the neutralisation of its fruity smell, and its decoloration, it can, in many cases, replace cane sugar with advantage. Those people who happen to be spending their holiday in Cyprus would find a courteous welcome if they cared to visit the installations of the Cyprus Wine and Spirits Co. (KEO) of Limassol, where grape sugar is being produced. The United Kingdom agents for this product are S.B. Metaxas.

Sugar Refinery Closes

One of the three surviving Greenock refineries, the Glebe Sugar Refining Co., has had to close down for an indefinite period owing to the imports of sugar and the decline in exports.

Enforced restriction of sugar trading has achieved what 121 years of competition could not. The 200 employees at the refinery will now be unemployed and a number of subsidiary trades will be affected.

An official statement by the Glebe directors says: "The Glebe Refinery has been working intermittently for the past six months and during that period the weekly melt has had to be reduced to an uneconomic level. In the course of recent months, the sugar division have purchased refined sugar from Czechoslovakia, East Germany, Poland, and Yugoslavia. The tonnage of these purchases has displaced and will increasingly displace British refined sugar in the home market, and, it is estimated, will necessitate a cut in U.K. refiners' production of approximately 10 per cent.

"In addition to the above purchases there has also to be taken into account a further purchase of white sugar from Formosa of at least 100,000 tons which will adversely effect U.K. refiners in both the home and export refined sugar markets.

"It is expected that about 40,000 tons will be shipped to the U.K. for direct consumption. It is consequently regretted that it has now become necessary to close the Glebe Refinery for an indefinite period.

"This is due solely to the enforced restricted distribution of refined sugar in the home markets for both domestic and manufacturers' requirements and the almost complete cessation of export orders from the Clyde. From January, 1950, to March, 1952, these export orders totalled 124,531 tons of refined sugar."

Iodine in Food

Compiled and published by the Chilean Iodine Educational Bureau (pp. 183+vii, price 21s. net) "Iodine Content of Foods" consists of an annotated list of 326 scientific papers known to contain qualitative or quantitative chemical facts about the presence of iodine in the foods of man and domestic animals. All these sources have been individually examined in the original, and data for 1,207 different food items extracted from them.

The material thus collected is arranged in 19 tables according to food type, the classification being practical rather than scientific.

Covering the whole is a short review which attempts to present a broad picture of the existing state of knowledge in this field and to assess the practical value of the assembled data.

Chemical Analysis of Cheese

The British Standards Institution have just issued a first revision of B.S. 770, "Methods for the chemical analysis of cheese." This document was first issued in 1938 and has now been brought up to date by giving a modified method for the determination of moisture, as well as methods for the determination of nitrogen, and the measurement of the hydrogen-ion concentration with a glass electrode.

Additionally, the document gives methods for the preparation of the sample, determination of fat, and salt.

Factory Hygiene

For the hygienic disposal of such articles as bandages and surgical dressings, the Barrywald automatic incinerator has a wide application in industry. Designed by Saniguard Appliances Ltd., this incinerator gives a simple disposal service. It is operated by the depression of a lever which automatically opens the receptacle, fume box, and combustion chamber covers, clearing the combustion chamber of ash remaining from any previous insertion and tilts the mercury vacuum switch. The latter, when tilted, switches on the electrical components to begin the disposal action.

Pasteurising Liquid Whole Egg

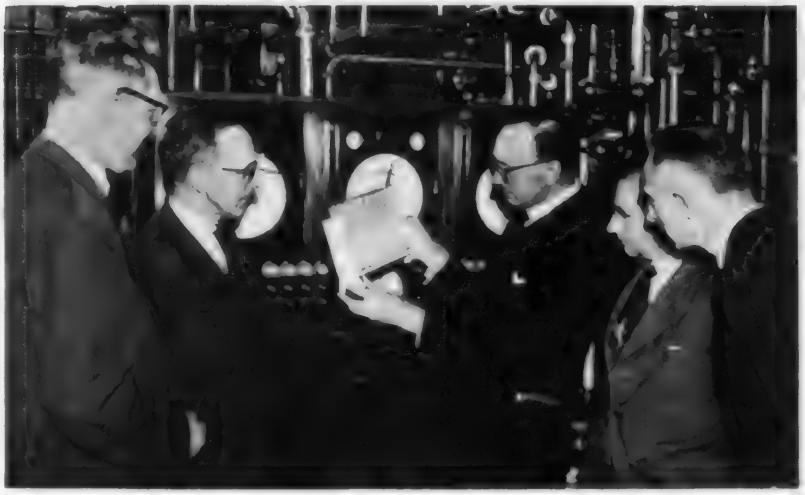
A short note on the pasteurisation of liquid whole egg in America was published on page 297 of the July issue of FOOD MANUFACTURE. This of course is not a new process; the A.P.V. Co. have supplied a large number of plants for pasteurising liquid egg, the plants being based on their standard dairy equipment and including the A.P.V. plate type pasteuriser.

In addition to the plant installed in the Belfast factory of Gracey Brothers for the pasteurisation of liquid egg (FOOD MANUFACTURE, 25. 7, 1950), the company supplied a number of Paraflows during the war through their American associates, Walker Wallace, for the pasteurising of liquid egg prior to drying to egg powder.

G.W.B.'s 21 Years of Progress

Early in 1931, before Britain had recovered from the trade depression, a company was formed, its future success being based on confidence in British industry as a whole and in the expansion of the industrial use of electricity in particular. G.W.B. Electric Furnaces was the logical outcome of an agreement between Gibbons Bros. and Wild-Barfield Electric Furnaces. The former had long been known as producers of large scale fuel-fired industrial furnaces, while the name of Wild-Barfield is widely acknowledged as one of the pioneers in the electric furnace industry, normally concerned with the design and manufacture of medium and small units.

The Autolec electrode steam raiser is a piece of equipment which has its application among other things in dairies and factories concerned with food production. It automatically and silently produces steam in any quantity and is readily installed. The use of this equipment is an easy way of raising steam without labour, dirt, and fuel difficulties which are normally associated with boiler houses.



Checking the result of the holding time test are (*left to right*) **Messrs. J. R. Cuttell (Service Manager, A.P.V.), W. Rushton (Ministry of Health), W. J. G. Godden (Food and Drugs Inspector, Borough of Hammersmith), G. H. Botham (Laboratory Manager, A.P.V.), and J. Collier (Food and Drugs Inspector, Borough of Hammersmith). The holding time test employed is the Dummett-Mongar test as modified by Botham, using sodium nitrite as a tracer and Griess-Ilosvay solution as an indicator.**

Pasteurisation of Ice Cream Mix

The first plant in this country pasteurising ice cream mix continuously on a commercial scale by the H.T.S.T. process under National legislation received official approval on May 22 at the ice cream factory of J. Lyons and Co. Temperature, flow rate, and holding time tests were carried out in the presence of Dr. J. Cauchi and Messrs. Rushton and Hole, of the Ministry of Health and Messrs. W. J. G. Godden and J. Collier, Food and Drugs Inspectors for the Borough of Hammersmith, by engineers of The A.P.V. Company, who were responsible for supplying and installing the H.T.S.T. pasteurisation plant. Representatives of the N.I.R.D., Shinfield, and J. Lyons and Co., were also present to observe the tests.

The plant employed for the pasteurisation of ice cream mix at Cadby Hall is a special arrangement of the APV Paraflow all stainless steel pasteurisation plant type HM similar to that used for milk pasteurisation. A three-throw piston-type homogeniser is used, to act as a pump as well as a homogeniser in place of the centrifugal pump and flow controller.

The statutory requirements of temperature and holding time, as laid down by the new Regulations, are that the mixture shall be raised to and kept at a temperature of not less than 175°F. for 15 sec., and the new plant was shown to fulfil both these conditions. Diversion and resetting temperatures were also shown to be satisfactory.

The introduction of the Ice Cream (Heat Treatment, etc.) Amendment Regulations, 1952, to permit pasteurisation of ice cream mix by the H.T.S.T. process was made largely as a result of investigations carried out during the past 2½ years on an experimental plant at Cadby Hall by A.P.V. engineers who, working in collaboration with the staff of J. Lyons and Co., were able to prove that effective pasteurisation of ice cream mix is possible by the H.T.S.T. process.

Great Britain is the first country in the world to introduce legislation authorising the application of the H.T.S.T. process to the pasteurisation of ice cream mix. Although it is known that a number of installations in the United States have received special authority to employ this process, these have been of an experimental nature. The new installation of J. Lyons and Co. is undoubtedly the first in the world to pasteurise ice cream mix by the H.T.S.T. process in full conformity with National legislation.

This implementation of the new Regulations represents a big step forward in ice cream manufacture, and offers the producer the opportunity to speed up his production and at the same time effect a material reduction in labour costs.

Corrigendum

In the article by Mr. H. Cheftel on the French Canning Industry published in the June issue of FOOD MANUFACTURE, the reference to Moroccan fish canners on page 229 was incorrect. It should read: "Fish canners in Morocco where cans are manufactured with modern, automatic, high-speed machinery and have been standardised for a number of years, are suggesting, for temporary commercial reasons, the adoption of Portuguese unstandardised, hand-made types of can."

National Fuel Policy

REPORT TO THE RIDLEY COMMITTEE

The Institution of Incorporated Plant Engineers has submitted to the Ridley Committee evidence on the importance of a co-ordinated National Fuel Policy.

The members of the Institution are professional engineers responsible for the installation, running, and maintenance of heat and power-using plant in privately owned and publicly owned industry and in Government-controlled establishments. Their views, therefore, are those of the actual industrial consumer of fuel.

The report makes the following suggestions:

1. Some relief of taxation is needed if industry is to install capital equipment for fuel efficiency purposes.

2. Boilerhouse operatives must be certificated and paid as craftsmen.

3. All managements, whether in private or public industry or in Government establishments, must be made to understand that fuel efficiency is a continuing problem at the root of the nation's economy.

4. Consulting engineering services, on a national basis, should be made available to industry by absorbing and expanding existing bodies including the Fuel Efficiency Branch of the Ministry of Fuel and Power.

5. Industry should receive supplies of electricity and gas at a fair price and without interruption. The price competition between these services for the domestic market and the sale of gas and electricity to the domestic consumer at an unrealistic price is thought to be a definite stumbling block to that end.

6. The energies of the B.E.A. should be turned away from the domestic field to that of railway electrification where the use of electricity has vast economies to offer.

7. There must be co-ordination between the Ministry of Fuel and Power and all the fuel-using Departments of the Government to eradicate those practices which are as wasteful as, or worse than, those in private industry.

8. Because the need for efficiency in fuel and power spreads through every field of national activity, it is believed that a National Fuel Policy cannot be implemented by any existing authority and the report recommends the establishment, under the Minister of Fuel and Power, of a National Fuel Trust.

The report draws attention to the fact that a National Fuel Policy requires action by the Treasury in matters of capital expenditure, by the Minister of Fuel and Power as a co-ordinator, by the National Coal Board, the B.E.A. and the Gas Boards both as suppliers and as users, by private industry as consumers, by private consultants as participators, by the Ministries of Transport, Works, Health, Education, and the Services as users.

It is argued that no existing body can implement a National Fuel Policy in all those spheres of activity. For that reason the report makes the suggestion that there should be set up, under the Minister of Fuel, a National Fuel Trust.

A National Policy for Fuel and Power would need to be published as a White Paper and submitted for the approval of Parliament. The necessary legislation arising from the agreed policy would then have to be passed.

The Institution of Incorporated Plant Engineers holds the view that the implementation of this policy should be the duty of a National Fuel Trust. It is suggested that the Trust should be under the control of a Director General who would be directly responsible to the Minister of Fuel and Power.

The Trust would be financed by a levy on non-domestic coal. One penny a ton would bring an income of some half-million pounds a year. From these funds the Trust would provide loans to any non-domestic user for approved schemes of capital expenditure.

Approval for such schemes would be decided by the Trust's own consulting service. This service would be established on a regional basis throughout the country, and would not be free except perhaps for an initial exploratory survey.

The Trust would be responsible for publicising the fruits of fuel and power research and for conducting the campaign to establish national awareness of all fuel and power needs and problems on the general lines of the agreed National Fuel Policy.

New Hoisting Blocks

Among the items which have been added to the range of lifting and shifting equipment manufactured by Geo. W. King, Ltd. is a stack hoist with a lifting capacity of 250 lb. and a speed of 75 ft. per minute. This is an adaptation of the company's well-known My-Te-Min. Another item is a light-weight hand chain block; weighing only 29 lb., it lifts ½ ton without effort. It is light, easily transportable, compact, with minimum headroom.

Manager for London Office

Mrs. Beryl Scott, formerly Mrs. Lincoln of the M.O.F., is managing the London office of the Red Breast Preserving Co. at 20, Sloane St., S.W.1.

Gas and Food Hygiene

There is an urgent need today for higher standards of personal hygiene and cleanliness in the handling of food. Under the Food and Drugs Act, 1938, all cafés, restaurants, and food shops are required by law to have adequate supplies of hot water available to ensure cleanliness.

Particular emphasis was laid on this aspect of the food industry by the Gas Council at the recent Food Fair. Their exhibit showed how the use of modern gas equipment can protect health and ensure cleanliness in the preparation and storage of food.

New Factory Site

Directors, managers, and work people of Vitamins Ltd., manufacturers of Bemax and pharmaceutical preparations, joined forces recently in digging the first trench at the company's new 10 acre factory site, at Crawley.

At the luncheon which followed, Mr. H. C. H. Graves, the chairman, said that this joint effort symbolised the spirit of co-operation in which their enterprise had been developed and would serve as a continuing reminder in the years ahead.

The first sod was cut by Mr. J. H. Wrentmore, who had been associated with the Vitamins Group of Companies since its foundation in 1921 and the photographs of that day's ceremony would, in this way, provide a link, at any rate until 2050—the duration of their 99 year lease—with their foundation in 1921.

Anniversary Celebrations

On the occasion of the 75th anniversary of the Coates Organisation, makers of printing inks, varnishes, printers' sundries, and surface coatings materials, the chairman and Board of Directors of the company entertained 470 of their employees on June 21 at Earls Court. After seeing the afternoon performance of the Royal Tournament, a dinner was held in the Stadium Grill Room.

In his speech replying to the toast of "The Company," the chairman emphasised the importance of the Groups' activities in the Commonwealth countries overseas, and said that these countries called for men and women with a spirit of adventure and offered great opportunities for those prepared to work hard. He hoped that some of the younger members of the Group would, if called, be prepared to join the Coates Companies in South Africa, India, New Zealand, and Australia.

A feature of the evening's celebration was the relaying, following the dinner, of a speech recorded in New Zealand by Mr. J. B. Coates, the managing director, who is at present on a tour of the overseas companies.

APPOINTMENTS

Mr. A. M. Knox has been appointed a member of the Board of Unilever Ltd. and it is intended to propose to this year's annual general meeting of the shareholders of Unilever N.V. that he also be appointed as a member of the Board of that company.

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The appointment of Curry and Paxton, Inc., 101, Park Avenue, New York, 17, as the agents and stockists of The Tintometer Ltd. has been announced. A full range of all their instruments and equipment is being displayed.

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Mr. D. Dennis, who first joined Fortnum and Mason as a £1 10s. 0d. a week junior clerk has been appointed general manager. He replaces Mr. B. Rand, who has retired from that position through ill health after over 40 years' service with the company. Mr. Rand remains a director of the company, and will continue to take an active interest in the running of the business.

Mr. Dennis has been with the store for 21 years, during which time he has made 15 business trips to the U.S.A., 12 to France, five to Czechoslovakia, and two to Austria.

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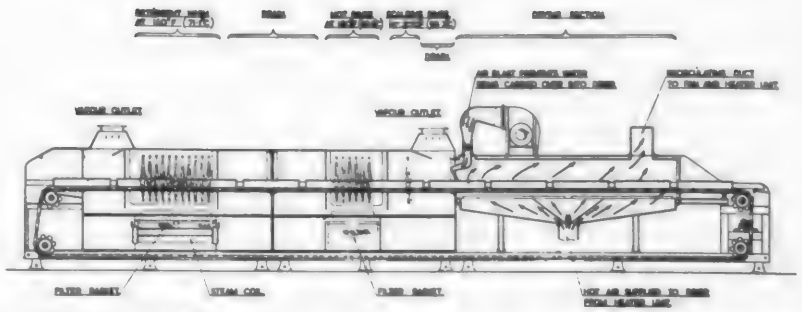
The President of the Council of Industrial Design has appointed the Rt. Hon. Lady Sempill, Miss Mary Grieve, Mr. George Breeze, Mr. Lynton H. Lamb, and Mr. Walter Lines to be members of the Council of Industrial Design. He has also reappointed Mr. Geoffrey Dunn, Mr. Leslie Gamage, M.C., Mr. John Gloag, Mr. G. W. Lacey, C.B.E., B.Sc., F.R.I.C., Sir William Palmer, K.B.E., C.B., Major F. J. Stratton, C.B.E., and Dr. W. J. Worboys, B.Sc., Ph.D., to be members of the Council on the termination of their existing appointment.

The President has also appointed Mr. W. D. Ritchie, O.B.E., M.A., F.E.I.S., to be a member of the Scottish Committee of the Council of Industrial Design. The Rt. Hon. Lady Sempill, Mr. J. Douglas Hood, Mr. J. McMurtrie Kay, and Mr. Andrew Nairn have been re-appointed to the Scottish Committee on the termination of their existing appointment.

Birthday Honours

Mr. Henry J. Ross, who as chairman of the Scotch Whisky Association since 1945 received a knighthood in the Birthday Honours List, has been, since 1948, chairman of The Distillers Co., which he joined at the age of 17 in 1911 as a yeast plant apprentice.



A typical arrangement for a tray washing machine with a capacity of up to 600 trays per hour.

Bakers' Tray Washing Machines

Bakers' tray washing machines made in various sizes with capacities ranging from 60 to 1,000 trays per hour, and specially designed to suit requirements depending on the size of trays to be handled, are manufactured by Dawson Bros.

The machines vary in length from 10 ft. to 50 ft. overall. The larger machines are fitted with a hot air recirculating chamber to assist drying. They may be used for baking utensils as well as trays, the smaller items being placed in suitable baskets with sinkers to keep the utensils in place.

The illustration shows a typical arrangement which has a capacity up to 600 trays per hour. The trays are loaded by hand on to the flight bar conveyor and receive a highly concentrated detergent wash at approximately 160°F., washing internally and externally and along the sides of the trays by means of pressurised jets. Following this, the trays pass forward into another compartment where they receive a hot rinse at approximately 180°F. Here again the wash is highly concentrated as before, and finally before passing into the drying chamber, they receive a scalding rinse at 200°F. This scalding rinse is provided from the towns main, and the water is heated to temperature by means of a steam and water mixing valve.

Just prior to the trays passing through into the chamber to assist drying, they are subject to an air blast which has the effect of shearing off them all the surplus water, thus preventing water being carried over into the drier. This air blast is provided by a separate fan and trunking mounted on the top of the machine. The position of this fan can be varied to suit site conditions at any time.

The first and second wash tanks are constructed in such a way as to provide easy access to all spray pipes for cleaning purposes. The spray pipes are arranged with a located connexion to the main pipe box which is fed from the pump. To remove a pipe for cleaning, the panels are raised, the pipe end clamp is slackened off and turned through 90°; this will allow the pipe to be withdrawn from its seating. The tanks are to be filled up to the level as indicated by the sight glass. The solution tank is heated by a steam coil and the hot water tank by a steam ejector.

Having raised the water to the required temperatures, the pumps are switched on and the water is recirculated to all jet pipes and returned to the tank.

Industrial Floors

The deterioration of factory floors under traffic can have serious consequences on output. Excessive wear of this nature can be overcome by the use of Betonac industrial floors. These are virtually dustless and are laid with a true surface which makes for easy running of trolleys and for cleaning. Ordinary concrete does not possess the toughness of these floors, which incorporate the use of metallic aggregate.

Apart from wear and dusting, failure frequently occurs in the average factory floor at a joint in the concrete where one bay meets the next; spalling at this place, once having started, becomes progressive until finally there is a depression in the floor sufficient to slow the traffic and cause damage to the trolleys. By the use of Betonac floors, which can be laid by Quickset Water Sealers in colour if desired, this type of failure can be prevented.

The company are experts in accelerating the setting of concrete and specialise in week-end repairs, which are so often necessary.

Herring Dispute Settled

A settlement has been reached in the dispute between herring curers and the Herring Industry Board over terms in connexion with the £850,000 cured herring deal with Russia.

The British Herring Trade Association—the curers' organisation—has accepted an amended offer by the Board of a guaranteed payment of 42s. 6d. per barrel, with a further payment of 5s. if earned.

Changes of Address

The Central Publicity Department of I.C.I. has moved its offices to the North Block (Ground Floor), Thames House, Millbank, London, S.W.1.

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Owing to the expansion of their business, Soya and Protein Products Ltd. have changed their registered office to larger premises. Their new address is 8 and 9, Gt. Pulteney Street, London, W.1. (Telephone: GERrard 9145 and 9312. Telegrams: Neolac, Piccy, London.)

BOOKLETS RECEIVED

A revised booklet with photos and descriptions of their latest vibrating screens has been produced by Sturtevant Engineering.

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An addition to the list of catalogues dealing with their Bell furnaces has been issued by G.W.B. Electric Furnaces.

▪

A booklet describing the use of Hyfoama as a substitute for egg whites, both in the bakery and confectionery industries, has been issued by Lenderink and Co.

▪

The summer number of Wall's magazine is as bright as their previous ones and presents attractively news of the many divisions of this large company.

▪

"Works Safety Committees," the tenth in a series of technical booklets issued by the Fire Protection Association has just been published. This contains suggestions for procedure in the case of fire in industrial premises.

COMPANY NEWS

The accounts presented with the chairman's statement for the 58th annual report of J. Lyons and Company include the Balance Sheet and Profit and Loss Account of the company. and the Consolidated Balance Sheet and Profit and Loss Account of the group comprising the company and its subsidiaries.

The net profit for the year is £615,075 which compares with last year's figure of £610,252. Dividends on Preference and Preferred Ordinary Stocks for the year have absorbed £260,511. The payment has been recommended of final dividends on the Ordinary, "A" Ordinary, and Proportional Profit capital at the same rates as last year, which, with the interim dividends paid in December last, will take £297,234. Included in this figure is a full year's dividend on the £660,000 "A" Ordinary Stock issued at the close of the previous year.

OBITER DICTA

• The Index of Retail Food Prices proves that no matter how much prices go up, food is cheaper than it was before it was as cheap as it is today.—*"Morning Advertiser."*

• The more the public can be educated in food hygiene the more selective they will be as to where to do their shopping or which restaurants they will patronise.—*Mr. A. Tyler, Chief Sanitary Inspector for Bath.*

• When it comes to eggs, the human race is very much under the wing of the hens. You can't get blood out of a stone and you can't get eggs out of a hen unless it chooses to lay.—*"News Chronicle."*

• More recognition should be given to the noble and prolific creature, the backyard pig, which could make a much greater contribution to food supplies if it were not for the Minister's restrictions on slaughter.—*Mr. Nabarro, M.P.*

• I cannot think of any single article of food that would be more appreciated by more people than a return to our tables of the pre-war quality dyed-in-the-skin pork sausage. —*Mr. Kenneth Hall, vice-chairman of the Caterers Association.*

• Despite the advances of science, or perhaps because of them, the mystery of the composition of the sausage is still with us; butchers are rightly jealous of the mysteries of their craft, since self-preservation is the first law of nature. —*The "Glasgow Herald."*

• Producers of meat and dairy products should be given the same positive assurance of outlets for their produce over the next 15 years as had recently been given to the meat producers of Australia and New Zealand. — *Sir James Turner, President of the N.F.U.*

• It needs courage combined with stubbornness to deal with this unfair system of price fixing, but if sufficient women have the courage to walk into a shop and when they are asked an unnecessarily high price, let them say in as unpleasant or miserable voice as they like: "I can't afford it." —*Stella Gore, "Irish Independent."*

The chairman reports limited progress—limited by causes beyond the company's control and not by any lack of effort. A considerable extension had been made to the company's factory in Fulham, which is principally devoted to the production of frozen cooked foods. In London the meal voucher business which is named the "Lyons Luncheon Club," continues to grow both at the Corner Houses and teashops, and serves a real need especially for the office worker. In addition to maintaining a full range of products, new ones are continually being put before the public.

It will not be expected that in a year in which the country's financial and raw materials position has been so difficult the company have found things easy. Many restrictions are still imposed. There have been cuts in rations and in imports of unrationed foods. A full share has been suffered of the accumulated effects of years in which taxation has made the proper replacement of capital assets more and more difficult, and of Budgets that have had the effect of reducing the standard of living to one low level of equality rather than of offering inducements to get above that level by work, efficiency, and thrift. The last Budget seems to have begun a change which is welcome if it is the forerunner of others which will relieve the burdens on industry, for it seeks to restore incentive to the individual. Unhappily, it stops at the individual and, instead of incentives for industry, it imposes new burdens. Perhaps they are necessary this year—on that there may be differences of opinion—but it is clear to everyone that our very livelihood depends on our industries competing in overseas markets. Should not the Government recognise that, where there has been monetary depreciation, it is useless to exhort industry to increase production unless steps are taken to encourage investment of additional capital by affording further tax relief in respect of all profit that is ploughed back into the business?

Increase in Sales

Last year's Semtex sales were 16 per cent. up on the year before, Sir Clive Baillieu, Dunlop chairman, told shareholders at this year's annual general meeting. There were increased demands both at home and abroad for its wide range of flooring products.

Closed for Holidays

It has been announced by Keith Blackman Ltd. that their Arbroath works will be closed from July 18 to August 4, and their Tottenham works from August 8 to August 25.

World Food News

FORTHCOMING EVENTS

Lyons Fair

The 35th International Fair will be held at Lyons from April 11 to 20, 1953.

Metallic Particles in Ground Meat

A magnetic device that traps the minute ferrous particles that inadvertently find their way into the raw ingredients of meat products is facilitating the preparation of sausage and similar meat packs. This device is described in *The National Provisioner*, March 15, 1952.

Designed by the Cesco Co., the trap is attached to the stuffer equipment and quickly picks up all fine metal particles and shavings that ride free with the ground raw meats, without disrupting stuffing production. It is non-electric and is enclosed in a protective case. The size of particles held by the magnetic trap ranges from minute specks hardly visible to the naked eye, to more sizeable metal slivers.

More Citrus Fruit for Yugoslavia

The Yugoslavian Government, with assistance from the Food and Agriculture Organisation, is moving ahead energetically to expand its citrus fruit industry.

Although Yugoslavia is one of Europe's major deciduous fruit and grape producers, in 1950 it grew only about 100 tons of citrus fruit. That same year, the Government, despite its almost total prohibition of consumer goods in order to conserve exchange, imported some 340 tons of citrus fruits, most of it from Israel. Even with this importation added to its home production, the total amount of citrus fruit available in 1950 gave the population of Yugoslavia a *per capita* consumption of only 16 grams—this comes to about one slice of a medium sized orange per person per year.

Norwegian-Polish Trade

A Protocol between Norway and Poland was signed in Oslo on April 30, 1952, covering the period April 1, 1952, to March 31, 1953.

Norwegian exports to Poland under this Protocol will include fish, oils, fats, chemicals, iron ore, aluminium, and various kinds of machinery.

Polish exports to Norway will include seeds, sugar, salt, coal, textiles, glass, chemical products, machinery, and tools.

Detailed lists of the goods to be exchanged may be obtained on application to the Commercial Relations and Exports Department of the Board of Trade (Tariff Section).

Irish Biscuit Factory

The British biscuit manufacturers, Messrs. Elkes, are to open a factory in Ballina, Co. Mayo, similar to their latest modern premises at Cardiff, which has all electrically driven plant. Irish key workers are to be trained in Britain.

British interest in the new factory is represented by Mr. S. H. Elkes and the Irish promoters are Messrs. Richard Barret, Patrick J. Rowe, and M. J. Murphy, all of Ballina.

Following negotiations between the promoters and the Department of Industry and Commerce in Ireland a substantial grant has been made to the company by the Government's Industrial Development Association, a body set up to promote industries in the Western part of the country where Ballina is situated.

The cost of building and installation of equipment is estimated at £250,000. About 250 people will be fully employed when, as expected, the factory gets into full production in February, 1953.

Preparing Poultry for Cold Storage

Because the temperature of freshly slaughtered poultry has to be reduced to 40°F. for storage, a processing system has been sought that would reduce the shock of immersion in ice water, since this causes contraction of the meat parts and contamination of the water. This requirement is met by the Steri-Cooler, an assembly line unit made by the Food Machinery and Chemical Corporation that washes, cools, and sterilises as much as 2,250 lb. of poultry per hour for cold storage (*Food Processing*, April, 1952).

The unit is 22 ft. long and consists of a set of four tanks, four recirculating pumps, a conveyor, and chlorinating apparatus. With the exception of the conveyor, which has rubber-covered metal tubes, the unit is constructed entirely of metal. The poultry is carried through a pre-wash section, the washing solution being continuously recirculated by the addition of fresh water in spray form at the exit end. From there, it passes to the second section which is recharged with water and ice at the beginning of each operating period. A chlorinated solution is added to the liquid to ensure sterilisation, and the solution is constantly circulated over the poultry.

The last two sections are filled and cobled in the same manner as the first two except that chlorination is reduced. Circulating solids and bacteria diminish as the poultry moves toward the exit end, leaving clean, cool, and sterilised well-shaped products ready for cold storage.

New Jelly Product

A new type jelly designed to meet modern needs, has been issued by the American Brands Corporation.

Known as Tobyjell, it contains fruit extracts, artificial flavour, and colour. It is made up in small 3 oz. packages which, together with three cups of sugar, makes 42 oz. of jelly. In its dry form it is almost indestructible, being unaffected by moisture and heat. In addition, the package is sealed on the inside in a moisture-proof bag which is packed in a chipboard box and wrapped in metal foil, so that any effect of moisture is completely eliminated.

Appointment of Agents for Brazil

The Commercial Relations and Exports Department of the Board of Trade has recently had a number of enquiries about the appointment of exclusive agents in Brazil, and has issued some notes for the guidance of exporters which have been compiled from information received from the Minister (Commercial) to Her Majesty's Embassy at Rio de Janeiro. This information is additional to that published on pages 32-33 of "Hints to Business Men Visiting Brazil, 1951."

Cold Storage in Italy

A special centre for the study and improvement of refrigeration technique has been created by the National Research Council at The Institute of Technical Physics which forms a part of the Faculty of Engineering at the University of Padua.

This centre has been set up in answer to Italy's need for improved methods of foodstuff preservation long enough for its sale and consumption.

A further step forward has now been taken, in co-operation with the Padua Fair Board, and a series of yearly meetings has been announced for the express purpose of studying all problems of a scientific, technical, and commercial nature that are connected with cold storage.

The first of these meetings, the First National Congress of Refrigeration, was held in Padua on June 12, 13, 14, and 15.

The two main themes of the Congress were pre-refrigeration and transportation in cold storage; and refrigeration by means of heat recovery.

At the same time as the Congress was held an exhibition of containers, packing, and other materials produced at the present time for the transportation of foodstuffs in cold storage.

Australian Egg and Egg Pulp

Australian eggs and egg pulp for Britain are going up 24 to 29 per cent. in price, according to Commerce Minister John McEwen. This follows a 25 per cent. increase for the 1951-52 season. The new prices will be effective for the last year of the long-term contract ending June 30, 1953.

Mr. McEwen said the British Ministry of Food had agreed to disregard the provision in the long-term contract with Australia that prices for any one season could not be varied by more than 7½ per cent. on the preceding season. Britain had also agreed that Australia could ship 7½ per cent. of her exportable surplus of eggs and egg pulp to markets outside Britain, compared with the previous limit of 2½ per cent.

A.M.I. deplores Horse Meat in Sausages

The OPS authorisation permitting the addition of horsemeat to sausage is an open invitation to crooks who have been selling horsemeat as beef, and further permits a practice which is prohibited by the Meat Inspection Division of the U.S. Department of Agriculture, declared the American Meat Institute recently.

"It is possible by analysis," said the Institute, "to determine whether raw meat is horsemeat, but if this should be mixed with beef in a cooked sausage product, it would be impossible to detect the substitution. Sausage is made in thousands of large and small plants all over the country, and this action by the OPS is an invitation to unscrupulous processors to debase one of America's fine, economical foods.

"For their own protection, we urge consumers to insist on getting sausage prepared by well-known, established sausage makers who, in the protection of their integrity, could not and would not add horsemeat to any of their products."

Radar and Refrigeration Afloat

Radar will be used to help with cooking in the new U.S. liner S.S. *United States*. Foods which under normal conditions take minutes or even hours to prepare will be cooked in a fraction of the time on the ship's "Radaranges." This equipment employs a magnetron tube (the same kind of tube used in all radar systems) to produce microwaves which, upon entering the food, set up the heat generating process necessary for cooking. The "Radarange" units for the S.S. *United States* compare in size with the ordinary home refrigerator. Each consists of a power supply, a magnetron unit, and an applicator or "horn" through which energy from the tube is beamed and thereby concentrated into the food.

Another feature of this ship is that she will make all her own ice whether in port or on the high seas.

Two York-FlakIce automatic ice makers, each capable of producing tons of ice daily, have been installed. The ice will peel off the stainless steel refrigerating drum in a thin fragment form so delicate that it will not even bruise the tender surface of fruit, fish, vegetables, or flowers.

When stored in insulated bins, this new type of ice tends to "shingle"; consequently, with cold air firmly trapped between the layers, the melting rate is considerably reduced. In the same way, when packed round products, the shingle delays melting and so the cooling action lasts longer than with cracked or chipped ice. When used in drinks, the cooling effect is quickened as the ice has a broader surface.

The ice is also unique in its purity. All drinking water contains a certain amount of sediment (distilled water being the only exception). A method has been found and is employed in the machinery used, that makes it possible to reject this sediment while the ice is being formed.

A specially designed battery of high speed, vibration-free York V/W Freon 12 compressors supplies the chill necessary for temperature ranges from zero to −25°F. for the 48,000 cu. ft. of refrigerated cargo space.

International Food Reserve

An international food reserve to help countries threatened by famine has been unanimously recommended by the 18-nation council of the Food and Agriculture Organisation. Delegates asked for an expert report to be submitted to the full autumn session of the organisation.

The reserve would be available to lessen the effects of famine brought about by natural causes, such as drought, plague, earthquake, or volcanic eruptions. Three alternative forms of reserve were suggested by the council: an internationally owned stock of food; an internationally owned emergency relief fund for buying food on need; and nationally owned stocks of food which Governments would pledge themselves to deliver on call.

The FAO Secretariat suggested that relief should be given in terms of "emergency food reserve units" (or EFRUS)—an EFRU being the amount needed to increase the diet of a million people by 1,200 Calories a day for a month. The FAO put individual subsistence needs at 1,900 Calories a day, but pointed out that at least some food was usually available in stricken areas. An EFRU, it was calculated, would absorb only 0·026 per cent. of the world's cereal trade, and would cost approximately £589,000.

Memorial Library Opened

The name of David Lubin, founder of the International Institute of Agriculture, one of the world's first international organisations and forerunner of FAO, was officially given to FAO's new library in Rome at a ceremony on June 10, the anniversary of Lubin's birthday.

This new library contains 400,000 volumes, and is the largest agricultural library in Europe. It is a synthesis of three libraries, those of the International Institute of Agriculture, the International Sylvicultural Centre, and the FAO library which was brought from Washington. It will also contain archives and documents of David Lubin, which tell the story of Lubin's efforts to establish the International Institute which, like its successor FAO, had its home in Rome.

Honour for FAO Director-General

Mr. Norris E. Dodd, Director-General of the Food and Agriculture Organisation, has been informed that the *Hochschule für Bodenkultur* (College of Agriculture) of the University of Vienna has granted him the honour of *Ehrenbürgerschaft* (honorary citizenship of the University). The honour was conferred *in absentia* on June 14, as Mr. Dodd was unable to attend the convocation.

This is the second honorary degree granted Mr. Dodd this spring. Pacific University, Forest Grove, Oregon, U.S.A., conferred upon him the honour of Doctor of Humane Letters while Mr. Dodd was in his home State in May. On that occasion, Mr. Dodd delivered the annual Isaac Hillman Lectureship series at Pacific University, which is the oldest institution of higher learning on the Pacific Coast of the United States.

Change of Name

The Trustees and Board of Governors announce the changing of the name of the Foundation of Applied Research, located on Essar Ranch at San Antonio, Texas, to Southwest Foundation for Research and Education.

The new name better describes the purposes and objectives of the institution as they have evolved in the years since its founding. The Foundation is primarily engaged in research and education in the fields of medicine, biology, and agriculture. In its graduate level educational programme, the Foundation is formally affiliated with Trinity University of San Antonio. The Foundation is also associated with Southwest Research Institute, the applied research organisation on Essar Ranch.

OVERSEAS ENQUIRIES

Mechanical Handling Equipment

Western Regional Sales, 106, S.E. Hawthorne Boulevard, Portland 14, Oregon, have expressed an interest in receiving proposals from United Kingdom manufacturers of all types of mechanical handling equipment, including conveyors, hoists, stackers, mechanical loaders and shovels, and fork lift trucks. The company act solely as manufacturers' agents, at present handling pumps, selling direct to distributors throughout 11 Western States.

Firms who are interested in this enquiry should send full particulars of their products, together with prices quoted in dollars c.i.f. Seattle, catalogues, and a statement concerning delivery position, direct to Western Regional Sales.

*

Confectionery Novelties

Messrs. Candy Specialties, 743, South Ceres Avenue, Los Angeles, 21, California, are interested in representing United Kingdom firms for the following:

1. A complete hard candy line.
2. A quality line of gold foil covered chocolate coins in mesh bags, etc.
3. Other novelties closely allied to the confectionery trades.
4. A line of fancy gift containers, tin, leather, etc.

The Los Angeles firm state that while they prefer to obtain direct representations, they would be prepared to undertake representations through an exclusive U.S. distributor, providing such arrangement is known and approved by the United Kingdom manufacturer. Their business is largely in Southern California and includes accounts in Arizona, New Mexico, Nevada, Oregon, and Washington.

United Kingdom manufacturers of the confectionery and other items listed, who are interested in this enquiry, should communicate with the U.S.A. firm direct, giving full particulars of their offers.

*

Confectionery and Foodstuffs

Mr. Irwin R. Tucker, of Irwin R. Tucker Co. Inc., 308, West Washington Street, Chicago 6, has expressed an interest in representing on a commission basis United Kingdom manufacturers of confectionery and foodstuffs items and in particular: (*a*) 1 lb. boxes of assorted chocolates to be supplied under a private label. He has a major wholesaler requiring a large quantity for autumn delivery and nation-wide distribution would be offered. (*b*) Bulk hard candies. (*c*) Jams and preserves, either in No. 10 cans for the catering and institutional trade or in attractive reusable jars, preferably 10 oz. or 12 oz. capacity for the retail trade. Particularly in the case of the items for restaurant and institutional trade, these products could be with an apple base, otherwise they should be pure preserves.

Irwin R. Tucker and Co., Inc. are food brokers acting as intermediaries between manufacturers and wholesalers or major retailers and working on a commission basis. They act on a continuing basis and generally have exclusive rights for the territory they cover. Mr. Tucker wishes to deal direct with British principals and does not wish to contact any British manufacturers who already have agents or distributors in New York who cover the entire U.S.A.

British manufacturers of confectionery and foodstuffs who are interested in this enquiry or who are seeking markets in the Middle West should communicate direct with Mr. Tucker giving full particulars of their offers. It will also be appreciated if responding firms would copy their offers to the British Consulate General, 39 South La Salle Street, Chicago 3, and also inform the Commercial Relations and Export Department of their action.

The products mentioned in this circular are subject to the regulations of the U.S. Food and Drug Administration, details of which are available from the Commercial Relations and Export Department of the Board of Trade.

*

Easter Eggs

Mr. E. E. Knight, 168a, Duckworth Street, St. Johns, Newfoundland, is interested in representing U.K. manufacturers of Easter novelties, including eggs both hollow and filled. Full particulars of the commodity should be sent direct to him by interested firms. The products mentioned in this circular are subject to the Canadian Food and Drugs Act and Regulations.

*

Chocolates

Messrs. Heurtematte and Co. Inc., French Bazaar, Panama, wish to contact U.K. manufacturers with a view to importing chocolates.

Firms who are interested in this enquiry should communicate with Messrs. Heurtematte and Co. Inc., direct.

*

Tapioca and Corn Dextrine

The Industrial Adhesive Co., 715, West Davies Street, Dallas, 2, Texas, are interested in receiving quotations for tapioca dextrine and corn dextrine. If the quality is acceptable and prices competitive, they would be interested in lots of 40,000 lb.

United Kingdom firms interested in this enquiry should communicate direct with Mr. Thomas W. Griffiths, the proprietor of the firm. Mr. Griffiths would have to receive samples so that his firm's chemists could carry out tests, before deciding whether or not offers are suitable. Full particulars, an indication of delivery dates, and c.i.f. quotations in dollars should also be given.

*

Home Bar Equipment

Mr. Alfred D. Hornstein, of Hornstein Photo Sales Incorporated, 320W, Ohio Street, Chicago 10, is interested in contacting British manufacturers of home bar equipment. The enquiry appears to relate to any accessories issued in the home for serving drinks, as opposed to those accessories used in the restaurant and tavern trade. Items such as fancy cockscrews, bottle openers, and bottle stoppers are suggested. It is emphasised that the items, while having practical qualities, should have some degree of novelty to make them appeal.

Firms interested in this enquiry should send full particulars of their products direct to Mr. Hornstein, sending quotations in dollars c.i.f. Chicago, catalogues, and details of deliveries offered.

U.S. Appointment

The General Manager of the Chicago operations of Geo. A. Hormel and Co., Mr. Ralph W. Keller, has been elected President of the National Meat Canners Association. Mr. Keller succeeds C. L. Nelson, manager of the Canned Meat Department of Libby, McNeill and Libby.

For the past two years Mr. Keller has been chairman of the Trade Relations Committee of the National Meat Canners Association. During that period the industry has engaged in several extensive and successful nation-wide canned meat sales programmes.

Trade Agreement

A Trade Agreement between the Federal German Republic and Finland was signed in Bonn on February 26, 1952. The Agreement came into force on the date of signature, is valid from January 1 to December 31, 1952, and will be extended by tacit understanding for periods of one year if it is not denounced by either contracting party at least three months before the end of such period. It replaces the Trade Agreement between Western Germany and Finland of February 8, 1949.

The full text of the Agreement may be obtained at the Board of Trade, Commercial Relations and Exports Department (Industries Branch), Room 6150 Horse Guards Avenue, Whitehall, London, S.W.1. (Telephone No.: TRAfalgar 8855, Extension 2420.)

News from the Ministries

Sugar Amendment Order

The Sugar (Prices) (Amendment No. 3) Order, 1952, came into force on June 15, 1952.

The amending Order replaced the Sugar (Prices) (Amendment No. 2) Order, 1952, and included Part III of the First Schedule which was omitted in error from the latter Order. Part III of the First Schedule lists the brands of caster sugar not subject to price control.

Flour Millers' Grists

Grists for breadmaking were altered in England and Wales on July 14, 1952, as follows: A maximum of 10 per cent. home-grown wheat; a maximum of 75 per cent. Manitoba wheat; a maximum of 15 per cent. Australian and/or white American wheat. For Glasgow, Leith, and Northern Ireland, a maximum of 75 per cent. Manitoba wheat. The remainder must be made up of native wheat and other imported wheats as available.

Sugar Beet Prices

Following consultation with the National Farmers' Union, the prices for sugar beet in the 1953 crop will be related to a more realistic value of the sugar percentage of beet produced and will be as follows:

Sugar Content per cent.	*Price per ton* s.	d.
14·5	107	3
15·0	111	0
15·5	114	9
16·0	118	6
16·5	122	3
17·0	126	0
17·5	129	9
18·0	133	6
18·5	137	3

The increase in the basic price per ton for early or late delivery will be as follows:

	Increase in price per ton s.	d.
Before October 1, 1953 ..	3	9
Between January 1 and 14, 1954	3	9
Between January 15 and 28	7	6
Between January 29 and February 11	11	3
From February 12 onwards	15	0

Milk—Specified Areas

On January 18, 1952, the Minister of Food declared his intention, subject to consideration of such representations as might be made, of laying before Parliament Orders to come into force on a date to be appointed specifying areas comprising the districts of Bristol and Bath, Birmingham and Wolverhampton, Bournemouth, Ebbw Vale, Liverpool, and Nottingham, under the Food and Drugs (Milk, Dairies, and Artificial Cream) Act, 1950. The Minister has considered representations which have been made and has agreed to defer the specification of the Ebbw Vale area.

The Milk (Special Designations) (Specified Areas) Order, 1952, specifying areas comprising the districts of Bristol and Bath, Birmingham and Wolverhampton, Bournemouth, Liverpool, and Nottingham is now laid in draft before Parliament for the requisite 40 days.

It is proposed that the new Order shall come into force as soon as possible after September 30, 1952. Its effect will be that from the appointed date all milk sold by retail within the areas listed above must be specially designated milk, that is, pasteurised milk, sterilised milk, tuberculin tested milk or (until September 30, 1954) accredited milk from a single herd.

Prices of Oils and Fats

The following reductions were made in the prices of acid oils allocated to primary wholesalers and large trade users during the four week period ending July 12, 1952:

Mixed soft acid oils from £106 to £102 per ton naked ex works.

Acid oils ex hardened oils from £90 to £75 per ton naked ex works.

Mixed acid oils ex margarine and compound refineries from £90 to £75 per ton naked ex works.

The prices of all other unrefined oils and fats and technical animal fats allocated to primary wholesalers and large trade users remained unchanged.

There will be no change in the prices of refined oils and imported edible animal fats allocated to primary wholesalers and large trade users during the eight week period ending August 9, 1952.

American Agriculture

A Report entitled "American Agriculture: Its Background and its Lessons" has been published for the Ministry of Agriculture and Fisheries by H.M.S.O. (price 2s. 6d. net).

Written by Mr. A. N. Duckham, who, as Agricultural Attaché at the British Embassy, Washington, from 1945-1950, saw something of the farming and agricultural background of each of the 48 States of America, the Report is illustrated and has a statistical appendix.

Following an introductory section on the geographical and social background of American farming, there are chapters on rural organisation and agricultural services, production techniques, and farm organisation and labour economy.

The author's main conclusions are, firstly, that the Americans could usefully learn a good deal from us about husbandry; secondly, that each country could learn something from the other about administration, research techniques, educational methods, and production techniques; and thirdly, that the northern and more progressive parts of America hold useful lessons for us in the field of farm organisation and labour economy.

Import Arrangements

Arrangements are now complete for the import from O.E.E.C. and certain other countries, during the second half of 1952, of biscuits, chocolate confectionery, chocolate couverture, and sugar confectionery, and of canned and bottled fruit. Imports will be separately licensed from each country.

The principal countries to which these arrangements apply are:

(*a*) *O.E.E.C. countries and their dependencies:*

Austria, Belgium, Denmark, France, Greece, Italy, Luxembourg, Netherlands, Norway, Portugal, Sweden, Switzerland, Trieste, Turkey, Western Germany.

(*b*) *Other countries:*

Afghanistan, Anglo-Egyptian Sudan, Bhutan, Brazil, Chile, China (including Manchuria), Egypt, Ethiopia, Finland, Formosa, Indonesia, Israel, Lebanon, Paraguay, Peru, Saudi Arabia, Siam, Spain, Syria, Uruguay, Yemen.

Prices of Milk

The Milk (Control and Maximum Prices) (Great Britain) (Amendment No. 2) Order, 1952, and the Milk (Control and Maximum Prices) (Northern Ireland) (Amendment) Order, 1952, came into force on July 1, 1952, and gives effect to the seasonal increase of ½d. a pint in the maximum retail price of milk announced by the Chancellor of the Exchequer in his Budget speech. Prices of milk at all other stages of distribution will also be increased by ½d. a pint on the same date.

There will be no change in the arrangements under the Welfare Foods Service for the supply of milk at the reduced price of 1½d. a pint to all expectant mothers and young children or in the arrangements under the Milk in Schools Scheme for the supply of free milk to school children.

Information and Advice

This Service is available for subscribers to FOOD MANUFACTURE. Postal replies will be sent if a stamped, addressed envelope is enclosed with enquiries.

Danish Pastries

B.5806. *Could you please supply us with a formula for making Danish pastries.* (S. Africa.)

Many formulae are used to produce fermented or Danish pastries, but the principle is the same in each case. A rich dough is mellowed by fermentation and partly aerated by puff paste principles.

The following ingredients can be used to make up these goods:

Flour	2½ lb.
Butter or cake margarine	½ ,,
Sugar	6 oz.
Salt	¼ ,,
Eggs	1 gill.
Egg yolks	2
Milk	¾ pt.
Yeast	4 oz.
Pastry butter	1 lb.

A cold dough is made up of all the ingredients except the pastry butter. This dough is left to ferment in a cold place for two hours. It is then pinned out and the pastry butter is rolled into it as if making puff pastry. Two turns are given to it, then after an hour another two turns are given.

This paste can be used after resting for a further hour, but better results are obtainable if it is left overnight in a refrigerator.

This paste can be moulded up into various shapes, and filled with numerous fillings such as custard, jams, curds, macaroon pastes, and nuts. Apples, pears, and pine-apples can also be used.

After moulding the pieces are proved for about half an hour, then baked in a fairly hot oven. When baked they should be washed over with stock syrup or masked with a fruit flavoured icing and roasted flaked almonds.

Tomato Juice

B.5827. *Could you please let us have some information regarding the production of tomato juice.* (Hants.)

Although tomatoes for juice production are grown cheaply in countries with a slightly warmer climate than that of the south of England, an industry was established there in 1947.

Fully coloured red tomatoes are used for juice production. The fruits are thoroughly washed, carefully sorted, and trimmed. The centre cores of tomatoes impart an unpleasant flavour to the juice and are generally removed, together with any unripe portions. There are several methods in use for preparing the juice, but it is generally accepted that the "hot-break" method produces the most satisfactory article.

Freshly expressed tomato juice contains an appreciable quantity of pectin which it is desirable to preserve in the finished product, because it prevents separation of the suspended solids. This pectin is rapidly destroyed by two pectic enzymes contained in the tomato. The "hot-break" method involves the heating of the chopped fruit as rapidly as possible to a temperature of 185°F. to destroy the enzymes and to obtain a greater extraction of pectin.

The heated tomatoes are then passed to continuous extractors in which fine screens are incorporated. The seeds, skins, and hard portions of the fruit are removed. Common salt (about ½ per cent.) is added to tomato juice to improve the flavour. For use as cocktail tomato, sundry other ingredients may be added such as vinegar, Worcester sauce, and lemon juice. A few trials would doubtless give the desired flavour.

Brisket Cooking

B.5834. *Could you please let us have some information on the cooking of brisket.* (Lancs.)

In cooking brisket, the meat should be just covered with boiling water. After a short cooking at boiling point, cooking is continued at simmering point for three to three-and-a-half hours, depending on the size of the briskets. If they are very large, a cooking whistle is inserted into the fat end in order to enable the hot water to penetrate into the joint. On removing from the cooking liquor, the briskets should be packed with the thick parts at either end and the fat on the outside as, in this way, the best distribution of fat is obtained.

Information Supplied

The Enquiry Service has dealt with requests for the names of manufacturers and suppliers of plant, machinery, and materials, and also general information as follows:

B.5808. *Ice cream cups.* (Malaya.)
B.5809. *Magnetic chutes and plate type separators.* (London.)
B.5810. *Hydrometers, vacuum gauges, and refractometers.* (Angus.)
B.5813. *Sodium benzoate as a preservative.* (London.)
B.5815. *Packet wrapping.* (London.)
B.5816. *Vegetable preparation.* (London.)
B.5817. *Lobster and crabmeat.* (Norfolk.)
B.5822. *Laboratory scale baking equipment.* (Essex.)
B.5823. *Formula for lactose in ice cream.* (Northumberland.)
B.5825. *Parmesan cheese.* (Yorks.)
B.5829. *Bland apple syrup.* (Somerset.)
B.5830. *Coffee roasters.* (U.S.A.)
B.5831. *Pork sausage.* (Ireland.)
B.5833. *Label gumming machines.* (Yorks.)
B.5843. *Emulsion coating.* (London.)
B.5844. *Banana drying.* (Eritrea.)
B.5846. *Machine for the extraction of oil from fruit skins.* (Herts.)
B.5847. *Manufacture of glucose.* (Dorset.)
B.5850. *Formula for custard powder.* (Ireland.)
B.5851. *Filters for syrup.* (Israel.)
B.5852. *Recipe for prepared mustard.* (Bucks.)
B.5854. *Pectin for piping jelly.* (Denmark.)
B.5855. *Lemon cheese.* (New Zealand.)
B.5856. *Meat pies.* (W. Australia.)
B.5858. *Pea suction device.* (Surrey.)
B.5861. *Poultry canning.* (Ireland.)
B.5862. *Pressure cooker coolers.* (London.)
B.5866. *Water softeners.* (Norfolk.)
B.5868. *Comparator discs.* (France.)
B.5869. *Filled wafer biscuits.* (Yorks.)
B.5870. *Popcorn.* (Warwicks.)
B.5871. *Metal detectors.* (London.)
B.5872. *Processed peas.* (Belgium.)

Recent Patents

675,280. REYNOLDS METALS CO.: Heat-sealing wrapping machine and method.
675,375. ROSE BROS. (GAINSBOROUGH), LTD.: Manufacture of paper and like bags.
675,495. BLANCHETTE, H.: Moulding and wrapping machine.
675,496. NUTE, A. E., and BRIZELL, H. J.: Apparatus for sorting automatically dough pieces and the like by weighing.
675,526. LAVERICK, J.: Apparatus for holding a sack or bag for filling.
675,527. HEFTI, H. R., and KOLB, W.: Process for the catalytic reduction of sugars.
675,534. MARATHON CORPORATION: Carton or like container and method of making same.
675,537. DUCHENNE, J. O.: Purification of sugar liquors.
675,661. JONSSON, H.: Extraction of oil from fish liver.
675,720. STANDARD CANNERS AND PACKERS, LTD.: Stemming of fruits such as grapes.
675,793. NATIONAL STARCH PRODUCTS, INC.: Stabilised starch derivatives.
675,821. ESSELTE FORPACKNING AKTIEBOLAG: Packeting machines.
675,979. TRIGGS, W. W. (Dorr Co.): Purification treatment of sugar bearing solutions by ion exchange.
675,996. RUHRUP, G. A.: Pudding powders in tablet form.
676,072. CROSSE AND BLACKWELL CO.: Compartment bottle.
676,308. GORDON AND CO., LTD., J., ARKELL, H. W., and GRIMSTON, W. L.: Grain and seed driers.
676,316. PERMUTIT CO., LTD.: Ion exchange processes.
676,369. ERASMIE, S. E. O. W.: Method of treating food products.

Abstract of a Recent Specification

Production of Gelatin

It is a primary object of this invention to provide a process which enables gelatin to be easily obtained from starting materials liable to felting.

A further object is to provide a process whereby the period of time required for treatment is relatively short, it being known that the grade of gelatin, whatever the starting material employed for its production may be, is better as the time of manufacture is shorter.

A still further object is to provide a process for the production of gelatin which can be performed continuously.

According to this invention, a continuous process is provided for the production of gelatin from skin shreds which comprises passing the shreds in the form of a succession of separate loose packs, with intervals between the packs, through an extraction zone, passing an aqueous collagen-hydrolysing and gelatin-extracting agent through the said zone countercurrent to the travel of the shreds, maintaining in the extraction zone a pressure gradient, which gradually increases and then gradually decreases as the material travels through the extraction zone and heating the said zone. In particular, a temperature gradient may be provided in the extraction zone so that the highest temperature occurs where the pressure is at its maximum.

In the preferred procedure the material to be extracted is conveyed through the extraction zone in separate sections of a conveyor mechanism, and the extracting medium is caused to travel through narrow passages between two successive sections for passing from one of said sections to the next one. Owing to this feature a stirring action favourable in respect of extraction efficiency and lack of felting is produced in each of the sections.

A convenient and advantageous manner of carrying out the above process comprises providing a variable hydrostatic pressure by arranging the extraction zone as a passage having a downwardly directed portion, an upwardly directed portion, and an intermediate horizontal bridging portion, thus, in particular as a **U**-shaped passage.

654,597. *René Emile Auguste Joseph Fréchin.*

Trade Marks

CHOC-O-LAIT.—691,562. Biscuits being wholly or partially coated with chocolate. **Scribbans-Kemp (London), Limited,** Empress Biscuit Works, North Circular Road, London, N.W.2; Manufacturers.
G.W.P.—699,004. Colouring matters for food. **George Walter Pickles,** trading as **Geo. W. Pickles and Co.,** 12, Jordan Street, Liverpool, 1; Manufacturer.
PUFFMINS.—702,567. Chocolate and non-medicated sugar confectionery. **J. Lyons and Company, Limited,** Cadby Hall, London, W.14; Manufacturers and Merchants.
LA GARDE.—703,159. Ham, pork, brawn, luncheon meat, sausages, and chicken, all being canned goods. **Compagnie Generale d'Importation S.A.** (a Société Anonyme organised under the laws of France), 5, rue St. Jacques, Marseille, and 52, Gresham Street, London, E.C.2; Merchants.
MULTAWHIP.—703,610. Artificial cream (for food). **Bakcos, Limited,** 11a, Broadway Chambers, Hammersmith, London, W.6; Manufacturers.
POWDAX. — 703,728. Flavouring essences (not being essential oils) for confectionery, ice cream, and for food. **H. E. Daniel, Limited,** St. Bernard Works, Stoney Lane, Upper Norwood, London, S.E.19; Manufacturers.
DRODA.—704,486. Frozen and chilled beef, sausage meat, meat pastes, and canned meats. **Stewart and Company, Limited** (a Joint Stock Company incorporated under the laws of the Irish Republic), 86, Merrion Square, Dublin; Merchants.
GULOSS.—704,623. Canned vegetables, canned fruit, canned fish, and canned meat. **Industrias de Alimentacao Idal Limitada** (a Portuguese Company with Limited Liability), Fabrica de Conservas de Tomate Guloso, Estrada Nacional No. 12, Vila Franca de Xira, Portugal; Merchants.
CONFECTA.—705,150. Honey, treacle, sauces, and spices. **Willharts, Limited,** 57, Meadow Road, Leeds, 11, Yorks; Manufacturers and Merchants.
SEACREST.—705,695. Canned fish. **North Shore Packing Company, Limited** (a Company incorporated under the laws of the Dominion of Canada), Malpeque, Prince Edward Island, Canada; Canners and Packers.

Recent patents and trade marks have been selected from the "Official Journal of Patents" and the "Official Trade Marks Journal" and are published by permission of the Controller of H.M.S.O.

New Companies

W. Spray and Son (Fat Refiners), Limited. (505693.) Mansel Street, Grimsby. Nom. cap.: £10,000 in £1 shares. Permt. dir.: J. W. Spray, Mirurlmar, Grimsby Road, Humberstone, Lincs.; Sub.: Mrs. M. A. Spray of same address.

British Oil Fractionators, Limited. (505704.) To carry on business of manufacturers, fractionators, manipulators, and refiners of and dealers in oils, chemicals, food products, etc. Nom. cap.: £100 in £1 shares. Dirs.: C. G. Heywood, 34, Peel Street, London, W.8, F. W. Burmann, W. J. Darby, H. P. Bibby, and L. Bibby. Sub.: E. A. Taylor, 8, Lancaster Mews, London, W.2 (secy.).

Honey-Creme Productions, Limited. (505719.) 55, Sutton Road, Erdington, Birmingham. To carry on business of manufacturers of and dealers in ice cream, cream, milk, milk powder, confectionery, etc. Nom. cap.: £5,000 in £1 shares. Permt. dirs.: A. R. Wedekind and Eveline Wedekind, 156, Park Road, Aston, Birmingham.

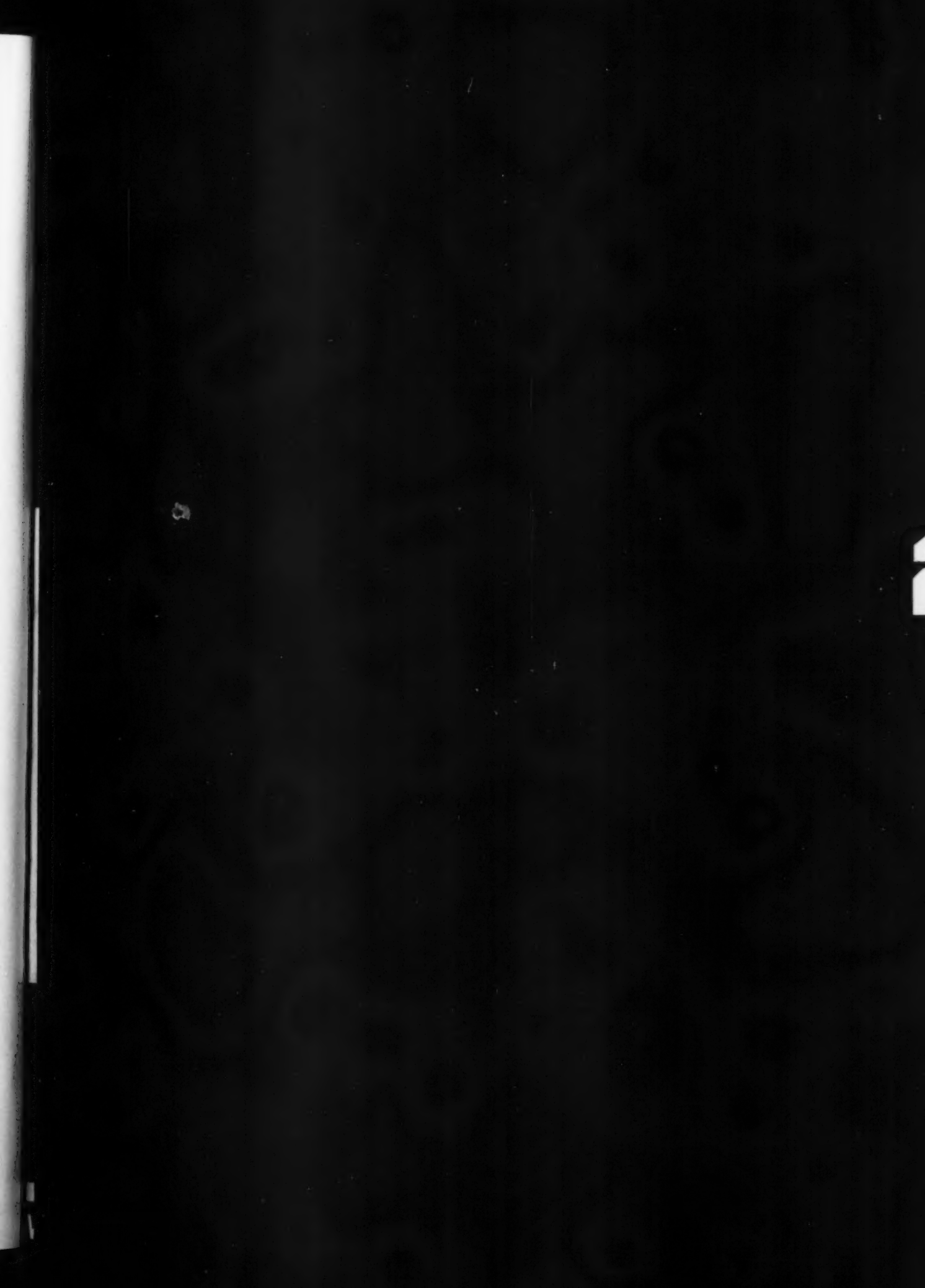
A. Pearce and Son (Millers), Limited. (505972.) King's Mills, Great Shelford, Cambs. To carry on business of flour millers and merchants, etc. Nom. cap.: £5,000 in £1 shares. Dirs.: E. A. Pearce and Gertrude A. Pearce, King's Mills, Great Shelford, Cambs.

Corbett (Canned Food), Limited. (505982.) To carry on business of canned goods dealers, etc. Nom. cap.: £100 in £1 shares. Dirs.: to be appointed by subs. Subs.: F. J. Parrott (clk.) and B. Sheridan (clk.), 5, Queen Anne Street, London, W.1.

Sutcliffes Food Products, Limited. (506028.) Park Road, Cliviger, nr. Burnley. Nom. cap.: £5,000 in £1 shares. Dirs.: H. Sutcliffe and Mrs. A. E. Sutcliffe, Westlands, Reedley Drive, Reedley, Lancs.

Thomas Preston (Paper Bags), Limited. (507795.) Fairfield Works, Radcliffe, nr. Manchester. To acquire that part of the business of Thomas Preston, Ltd., which comprises the manufacture of and dealing in paper and cellofilm bags, etc. Nom. cap.: £50,000 in £1 shares. Dirs.: not named. Subs.: H. W. Wane, 1, Crosby Road, Radcliffe (co. dir.), and J. F. Palin, 52, Thornhill Road, Heaton Mersey, Stockport.

Guy Manikum Produce (Sales), Limited. (507811.) 59, Brompton Road, London, S.W.3. To carry on business of vendors, buyers, importers, exporters, merchants, dealers, factors, producers, manufacturers, and packers of commodities, goods, foodstuffs, canned goods, and chemicals, and to trade in bottles, casks, jars, etc. Nom. cap.: £100 in £1 shares. Dirs.: to be appointed by subs. Subs.: F. E. Smith, 59, Brompton Road, S.W.3 (acct.), and W. J. Spurgion, 4, Andrews Close, Epsom, Surrey (clerk).

Fondant Confectionery Company, Limited. (507921.) 73/5, Mortimer Street, London, W.1. Nom. cap.: £1,000 in £1 shares. Dirs.: to be appointed by subs. Subs.: Phyllis Draycott, 16, Lynette Avenue, Rochester, Kent (secretary), and B. M. Walls, 54, Chestnut Avenue, Esher, Surrey (secretary).

From Jordan and Sons, Limited, Company Registration Agents, 116, Chancery Lane, London, W.C.2.